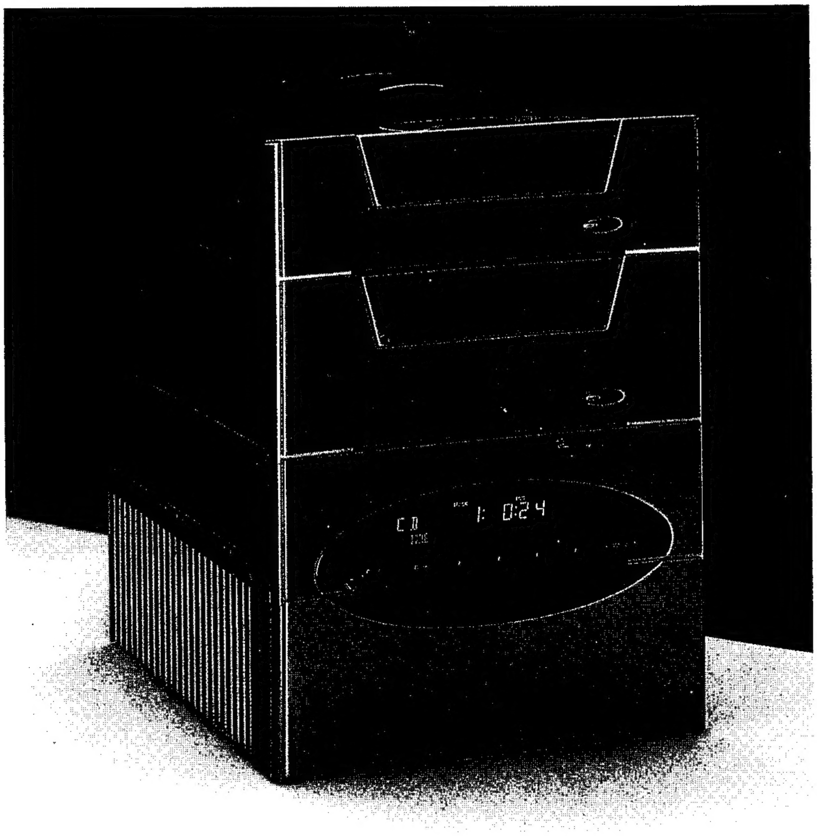
The Harman Kardon
FESTIVAL 300 / 500

Intelligent music systems

Technical Manual



harman / kardon

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1112-F300/500 P-0194 800 PRINTED IN KOREA

TABLE OF CONTENTS

GENERAL SECTION

TUNER SECTION

AMPLIFIER SECTION (A300)

AMPLIFIER SECTION (A500)

TAPE DECK SECTION

CDP SECTION

THE FOLLOWING MARKS FOUND IN THE PARTS LIST OF THIS MANUAL IDENFIFY THE MODEL AS FOLLOWS

USA : NORTH AMERICA AREA MODEL
I,IB,BB : INTERNATIONAL MODEL

SPECIFICATION

Festival 300/500

CDP :

System	Compact Disc Dgital Audio
D/A Convert	Dual, linear, Pulse Width Modulated Bit Stream, Clock Rate: 33.8688 MHz
Signal Detection	3-Beam Semicondctor Optical Laser Pickup
Error Correction	CIRC System
Low Level Linearity	±1.0 dB @-90 dB
Frequency Response	4 Hz – 20 kHz 0dB/-1.5dB
Total Harmonic Distortion	0,007%
Dynamic Range	97 dB
Singnal to Noise Ratio	101 dB
Channel Separation	88 dB
Line Output Level/Impedance	1.6-2.0V @10 kohm
Dimension (m/m) (H×W×D)	80×270×335
(in.)	3 1/8×10 5/8×13 1/4
Weight (Kg)	3.2
(lb)	7.1
Laser wave length	760~780nW
Laser output power	0.4Watt

Tape Deck :

Type	Horizontal 4-track, 2 channel Auto reverse
Heads	1 hard permalloy Rec/Play Head 1 double gap Erase Head
Tape Speed	4.75 cm/sec 1 7/8 IPS
Frequency Response @-20dB	20 Hz -19 kHz ±3dB (Metal Tape)
Wow and Flutter NAB, WRMS/DIN	0.05%/0.08%
Signal to Noise Ratio.	
w/CRO2, A-WTD Dolby off	57 dB
Dolby B on	65 dB
Dolby C on	73 dB
Total Harmonic Distortion (1 Khz, metal tape, Dolby level)	1.0%
Channel separation	45 dB
Channel Crosstalk	70 dB
Erase ratio	60 dB
Bias Frequency	105 kHz
Output level, Dolby level	365 mV
Input level Dolby level	365 mV
Dimension (m/m) (H×W×D)	100×270×335
(in.)	4×10 5/8×13 1/4
Weight (Kg)	3.8
(lb)	8.4

REMOTE CONTROL :

Dimension (mm/in)	19×43×168	3/4×1 5/8×6 5/8
Weight (kg/lb.)	0.14/0.31	

FM Tuner Section:

Tuning Range	87.5 – 108.0 MHz	
Usable Sensitivity Mono	13.2 dBf	
50dB Quieting Sens, Stereo	47.2dB	I.IB.BB
	40dBf	USA
Signal to Noise Ratio @ 65 dBf –	70dB/65dB	I.IB.BB
Mono/Stereo	78dB/70dB	USA
Capture Ratio	1.5 dB	I.IB.BB
Selectivity, Adjacent/Alternate Channel	10 dB/75 dB	
IF rejection	90 dB	
Stereo Separation @ 1 kHz 65dBf	50 dB	USA
	47 dB	I.IB.BB
THD @ 1 kHz, 65dBf Mono/Stereo	0.15/0.20%	

AM Tuner Section:

	520-1710 kHz	USA
Tuning range	522 – 1611 kHz	I.IB.BB
Sensitivity	400 μV/m	≤ 700 μV/m
Selectivity	30 dB	≥18 dB
Image rejection	40 dB	≥ 30dB
IF rejection	65 dB	≥ 55 dB
Dimension (mm/in.)	80×270×335	3 1/8 10 5/8 13 1/4
Weight (kg/lb)	4.0/8.8	

Amplifier	A500	A300
Continuous Average Power 4 Ohm 20Hz-20kHz 0.3% THD	60 Watt	35 Watt
High Instantaneous Current Capability	±35 Amps	±25 Amps
Negative Feedback	20 dB	20 dB
Power Bandwidth @ Half Rated Power (into 4 Ohms)	10Hz-100KHz	10Hz-100KHz
Frequency Response @ 1W+0/-3dB	0.5Hz-180KHz	0.5Hz-180VHz
Slew Rate	140V/μ sec	100V/μ sec
Rise Time	1.8μ sec	1.8μ sec
Damping Factor	60	60
Signal to Noise Ratio (below rated, power, A-wtd)	98 dB	98dB
Tone Control Range (+/-) (Bass @ 50Hz/Treble @ 10 kHz)	10/10 dB	10/10dB
Bass assist Boost @ 55 Hz	6 dB	6dB
Dimension (m/m) (H×W×D)	100×270×335	100×270×335
(in.)	1/4×10 5/8×13	1/4×10 5/8×13 1/4
Weight (kg)	6.6	5.5
(lb)	14.5	12.1

Specifications and components are subject to change without notice.
Overall Performance will be maintained or improved.

SAFETY PRECAUTIONS

Before returning an instrument to the customer, always make a safety check of the entire instrument, including, but not limited to, the following itmes:

a. Be sure that no built-in protective devices are defective and /or have been defeated during servicing.

(1) Protective shields are provided to protect both the technician and the customer, Correctly replace all missing protective shields, including any removed .for servicing convenience.

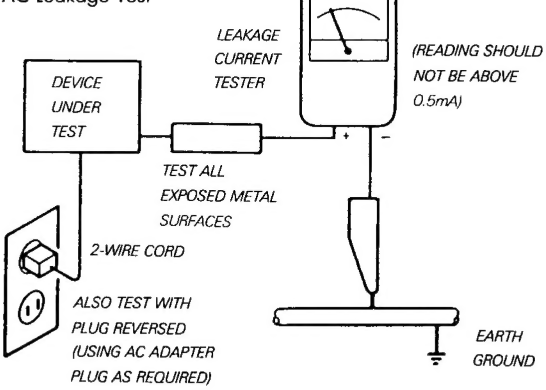
(2) When reinstalling the chassis and/or other assembly in the cabinet, be sure to put back in place all protective devices, including, but not limited to, nonmetallic control knobs, insulating fishpapers, adjustment and compartment covers/shields, and isolation resistor/capacitor networks.

Do not operate this instrument or permit it to be operated without all protective devices correctly installed and functioning.

b. Be sure that there are no cabinet openings through which an adult or child might be able to insert their fingers and contact a hazardous voltage, Such openings include, both are not limited to, excessively wide cabinet ventilation slots, and an improperly fitted and/or incorrectly secured cabinet back over.

c. **Leakage Current Hot Check**-With the instrument completely reassembled, plug the AC line cord directly into a 120V AC outlet. (Do not use an isolation transformer during this test.) Use a leakage current tester or a metering system that complies with American National Standards Institute (ANSI) C101. 1 "Leakage Current for Appliances" and Underwriters Laboratories (UL) 1270. (34.6). With the instrument AC switch first in the ON position, and then in the OFF position, measure from a known earth ground (metal waterpipe, conduit, etc.)to all exposed metal parts of the instrument (antennas, handle bracket, metal cabinet, screwheads, metallic overlays, control shafts, etc.), especially any exposed metal parts that offer an electrical return path to the chassis. Any current measured must not exceed 0.5 milliamp. Reverse the instrument power cord plug in the outlet and repeat test. **ANY MEASUREMENTS NOT WITHIN THE LIMITS SPECIFIED HEREIN INDICATE A POTENTIAL SHOCK HAZARD THAT MUST BE ELIMINATED BEFORE RETURNING THE INSTRUMENT TO THE CUSTOMER.**

AC Leakage Test



d. **Insulation Resistance Test**

(1) Unplug the power supply cord and connect a jumper wire between the two prongs of the plug.

(2) Turn on the power switch of the instrument.

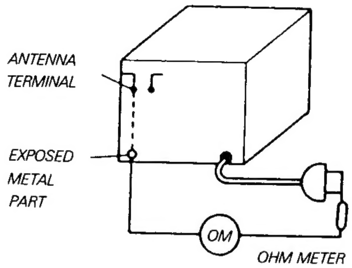
(3) Measure the resistance with an ohmmeter between the jumpered AC Plug and each **exposed metallic** cabinet part on the instrument, such as screwheads, antenna, control shafts, handle brackets, etc. The reading should be as shown below. If it is not within the limits specified, there is the possibility of a shock hazard, and the instrument must be repaired and rechecked before it is returned to the customer.

e. **Insulation Resistance Test Cold Check**

(1) Unplug the power supply cord and connect a jumper wire between the two prongs of the plug.

(2) Turn on the power switch of instrument.

(3) Measure the resistance with an ohmmeter between the jumpered AC plug and each **exposed metallic** cabinet part on the instrument, such as screwheads, antenna, control shafts, handle brackets, etc. When the exposed metallic part has a return path to the chassis, the reading should be between 1 and 5.2 Megohm. When there is no return path to the chassis, the reading must be "infinite". If it is not within the limits specified, there is the possibility of a shock hazard, and the instrument must be repaired and rechecked before it is returned to the customer.



PRODUCT SAFETY NOTICE

Some electrical and mechanical parts have special safety related characteristics which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc. parts that have special safety characteristics are identified by shading, by (⚠)on schematics and parts listed. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire, and/or other hazards. Products Safety is under review continuously and new instructions are issued whenever appropriate.

SERVICING PRECAUTIONS

CAUTION: Before servicing instruments covered by this manual and its supplements, read and follow the SAFETY PRECAUTIONS on this page.

NOTE:If unforeseen circumstances crated conflict between the following servicing precautions and any of the safety precautions, **always follow the safety precautions.**

Remember:Safety First.

General Servicing Precautions

a. Always unplug the instrument AC power cord from the AC power source before:
   (1) Removing or reinstalling any component, circuit board, module, or any other instrument assembly.
   (2) Disconnecting or reconnecting any instrument electrical plug or other electrical connection.
   (3) Connection a test substitue in parallel with an electrolytic capacitor in the instrument.
   Caution:A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.

b. Do **not** defeat any plug/socket B+ voltage interlocks with which instruments covered by this manual might be equipped.

c. Do **not** apply AC power to this instrument and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.

d. Always connect a test instrument's ground lead to the instrument chassis ground before connecting the test instrument positive lead. Always remove the test instrument ground lead last.

NOTE: Refer to Safety Precautions on page 3.

(1) The service precautions are indicated or printed on the cabinet, chassis or components. When servicing, follow the printed or indicated service precautions and service materials.

(2) The Components used in the unit has a specified conflammability and dielectric strength. When replacing any components, use components which has the same ratings. Components marked (⚠)in the circuit diagram are important for safety or for the characteristics of the unit. Always replace whit the appointed components.

(3) An insulation tube or tape is sometimes used and some components are raised above the printed wiring board for safety. The internal wiring is sometimes clamped to prevent contact with heating components. install them as they were.

(4) After servicing, always check that the removed screws, components and wiring have been installed correctly and that the portion around the servi ce part have not been damaged and so on. Further check the insulation between the blades of attachment plug and accessible conductive parts.

Insulation Checking Procedure

Disconnect the attachment plug from the AC outlet and turn the power on. Connect the insulation resistance meter (500V) to the blades of the attachment plug. The insulation resistance between the each blade of the attachment plug and accessible conductive Parts (Note 1)should be more than 1M-ohm.

Note 1: Accessible Conductive parts including Metal Panels, Output jacks, etc.

ELECTRO STATICALLY SENSITIVE(ES) DEVICES

Some semiconductor (solid state)devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some fieldeffect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor compornent or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap davice, which should be removed for potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static solder removal device. Some solder removal devices not classified as "anti-static"can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charge sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.
   CAUTION:Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device).

CLASS 1 LASER PRODUCT

Product complies with DHHS rules CFR subchapter J part 1040:10 at date of manufacture.

DANGER–invisible laser radiation when open and interlock failed or defeated. Avoid direct exposure to the beam.

CAUTION–use of all controls, adjustments or performance of procedures other than those specified herein may result in hazaudous radiation exposue.

CLASS 1 LASER PRODUCT
LASER KLASSE 1
LUOKAN 1 LASERLAITE
KLASS 1 LASERAPPARAT

Be Careful of the Laser Pickup

Although you cannot see it from the oustide, a laser pickup is located under the disc ruay and a precision lens is built in it.

Since the laser pickup, including the lens element, is especially sensitive to dust, keep the disc tray closed when not in use.
Also do not put your hand inside the unit.

ADVARSEL:

Usynlig laserstråling ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsættelse for stråling.

VAROITUS!

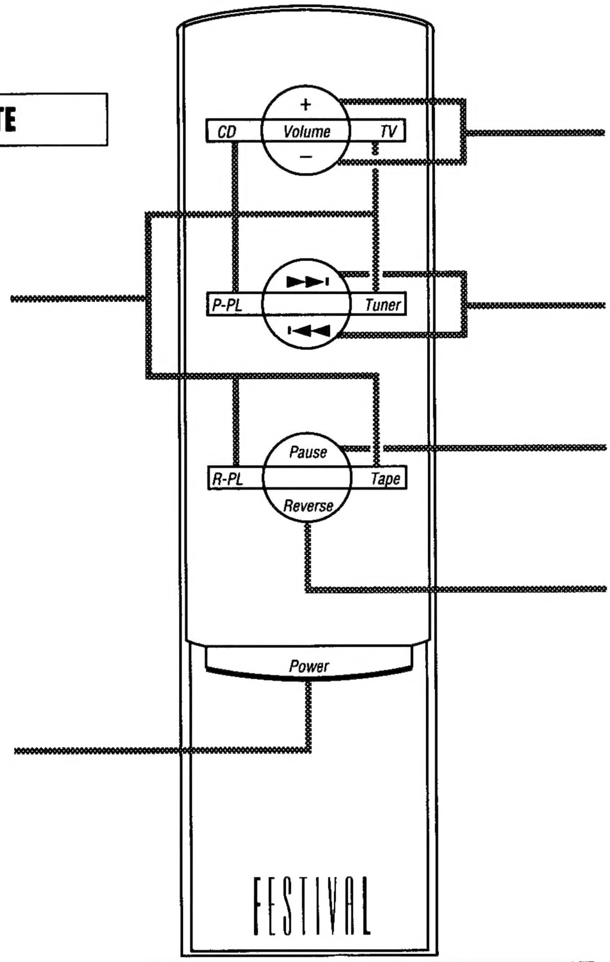
Laite sisältää laserdodin, joka lähettää näkymätöntä silmille vaarallista lasersäteilyä.

COMPONENTS AND THEIR FUNCTIONS

OPERATING THE REMOTE

Press one of these to change the source of the music:
- CD for disc
- P-PL (program play) for favorite songs from disc
- R-PL (random play) for songs from disc in random order
- TV (optional) for auxiliary components
- TUNER for radio
- TAPE for cassette

Press POWER to turn system on and off.



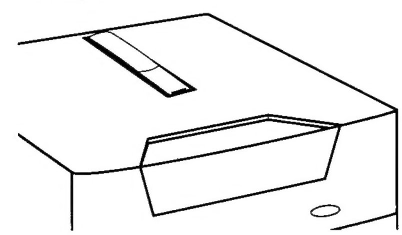
Press VOLUME + and – to adjust sound level up or down.

Press directional buttons ►►I and I◄◄ to tune stations or move one track at a time through a disc or tape. (Press and hold ►►I and I◄◄ for two seconds to go up or down to the next radio station preset.)

Press PAUSE to mute sound.
Press VOLUME + or PAUSE again to resume listening.

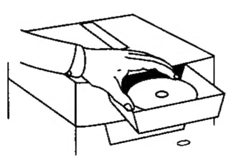
Press REVERSE to play the opposite side of a tape.

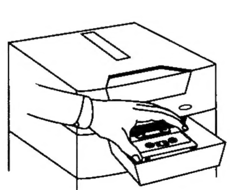
NOTE: When not in use the remote may be placed in the cradle on top of the CD Player.



FRONT PANEL CONTROLS AND ELECTRONIC LABELS

CD and Tape Drawers
The button to the right of the drawer on the CD and tape players can be pushed to open and close the drawer when inserting discs and tapes.





Except for the open/close buttons, all front panel controls are located on the tuner-controller within a large oval window.

All system functions are accessed through pushbuttons located across the middle of this window. Additional set-and-forget controls are located behind a pull-down gate located immediately below the row of pushbuttons.

NOTE: The speaker switch(es) behind door must be pushed in to hear music.

The "EXTERNAL" indicator reminds you to check your external components, if any, anytime the auxiliary input/output jacks are in circuit. If "EXTERNAL" is lighted, but there is no sound, make sure your external device(s) are on.

Here is the large four letter operating mode display, which shows at a glance which source is playing or if you're in CD favorite track programming mode (CDPR) (CD program).

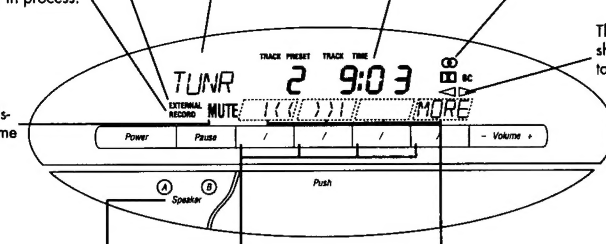
The main numeric display shows the CD track or radio station you're listening to, or the tape counter time.

The Dolby® noise reduction indicator comes on to show the type of noise reduction being applied to the tape.

"RECORD" indicates that a recording is currently in process.

The tape direction indicators show the actual direction of tape movement.

"MUTE" is displayed anytime the PAUSE control is engaged.



Note:
The speaker switch(es) behind door must be pushed in to hear music.

The functions of these four buttons are identified by these four ELECTRONIC LABELS directly above them, allowing the functions to change. To activate Electronic Labels, simply press any of these four buttons. Then proceed by pressing the button directly below the feature label you wish to use. If at any time you to wish start over, simply wait 10 sec. and start again.

Operating Modes

Festival systems simplify operation by grouping all commands into three basic modes.

We call source selection the "listen mode"—**LSTN** for short. Programming is **PROG.** (program). And recording is **RCRD.** (record). The three of them together comprise your main menu of choices, and all functions are accessed through one or the other of the three operating modes. All functions are operated in essentially the same way, that is, by pressing the unmarked button immediately below the label designating the function on the display.

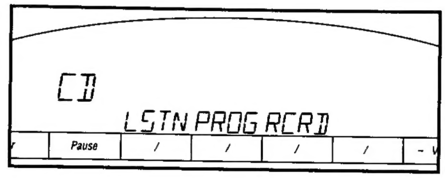
The Main Menu

Everything starts with the main menu, and you can get to the main menu one of two ways.

Press POWER on the far left of the row of buttons to turn Festival on. The display will light up, and the system will activate the source in use when the system was turned off. (When turned on for the first time, Festival will choose TUNR for the radio.)

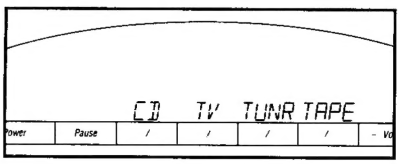
If the power is already on, press any one of the four unmarked buttons in the middle of the row.

In either case, the main menu will appear on the display.



LISTENING

The LSTN mode lets you select the tuner, the CD player, or the cassette deck, as well as one auxiliary source. When you press LSTN the display reads:

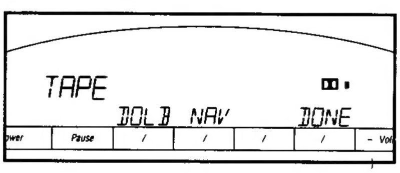


TV refers to an auxiliary source. The other labels refer to the Festival components.

Select a source by pressing the button immediately below the electronic label. Note that when you select any source other than TV you automatically access the functions for that source and that source begins to play.

TAPE LSTN (Listen) Functions

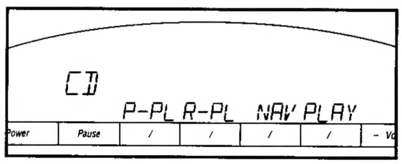
When you select TAPE, the display presents you with two functions:



DOLB stands for Dolby® noise reduction which is selectable through the DOLB button. Press repeatedly to choose Dolby B type noise reduction, Dolby C, or no noise reduction. When Dolby noise reduction is engaged ◘◘ will be shown in the display along with the letter designation B or C.

CD LSTN Functions

When you select CD, the CD begins to play and the following choices appear on the display:

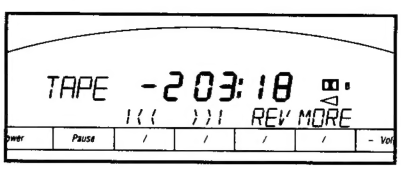


Note that if the CD player is empty, the drawer will slide out, prompting you to load a disc and push the drawer closed.

P-PL (program play) indicates programmed play. In order to exercise this function, you must first program your favorite selections for the current disc. Refer to the section on programming for programming directions.

R-PL (random play) indicates random play. Press R-PL and the CD player will automatically select a random order for playing back the tracks on the CD in the loading tray.

Press NAV (navigate) and the directional indicators |((and))| will appear on the display.

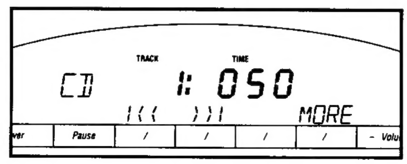


|((will automatically rewind the tape back to a previous song and))| will advance it to a subsequent song. The number of songs to be skipped forward or back are indicated to the left of the tape counter in the display.

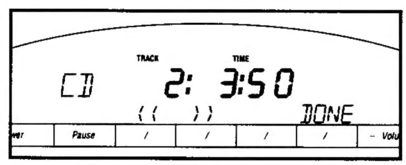
REV — As on the remote, pressing REV reverses the tape. It can also be used to cancel fast forward or rewind. (See below.)

PLAY—Press PLAY to switch from P-PL or R-PL to normal CD play, beginning with the current track.

NAV (navigate)—Press NAV and you can move from track to track using the buttons under the |((and))| labels. appearing on the display.

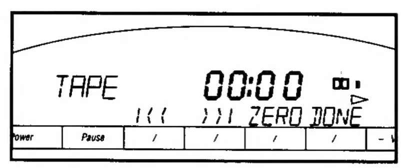


MORE — Press MORE and you can search up or down through the disc to any passage using the buttons beneath the ((and)) labels.



DONE always returns you to the main menu.

Pressing MORE displays:



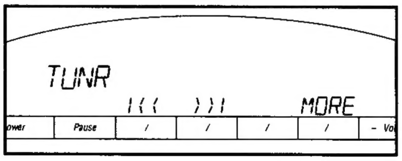
Rewind and Fast Forward — Press ((to rewind to the beginning of the current side and)) to fast forward to the beginning of the next side.

ZERO — Press ZERO to reset the tape counter.

Important Note: The controls on this page will function when the tape is paused by the PAUSE button. This feature can be used to set up for a manual recording. (See Appendix D).

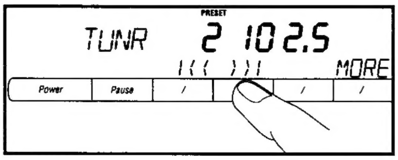
LISTENING

TUNR LSTN Functions
To play the tuner, first select LSTN and then select TUNR from the LSTN choices. The display will now read:



Pressing either directional key will put you into the SEEK mode, and the tuner will proceed to the first strong station.

Press and hold either directional key for two seconds to call up or change the PRESET number (1 to 19) in the display. Continue to hold the directional key to cycle through your presets.

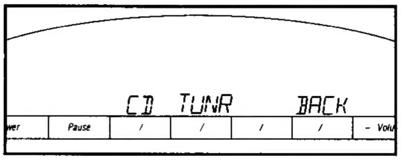


AM and FM Tuning
Press MORE to activate the manual tuning function. Use the directional keys to tune up and down the bands. Note that the Festival systems do not have a manual AM/FM switch. To get from one band to another hold either directional key and run through the band you're currently occupying. You'll automatically pass into the other band. (Note that if you use FM only, push the switch on the tuner back panel to bypass the AM band when tuning.) Save your favorite stations in the presets in the PROGRAMMING MODE,

PROGRAMMING

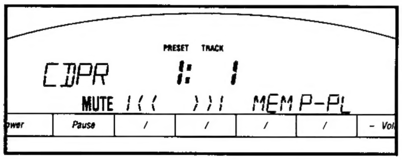
Programming the CD player
Load the CD in the compact disc player. Enter the main menu. Select PROG (program).

The display will prompt you to choose a source to program. Note that BACK always returns you to the previous display screen.



The Festival compact disc player and tuner are programmable. Programming the tuner consists of saving station presets, while CD programming lets you choose your favorite tracks from a given CD for playback by the P-PL command.

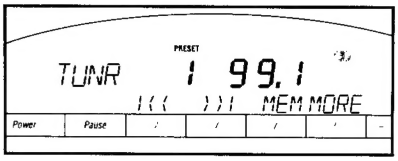
Press CD to program the CD player. The display now reads:



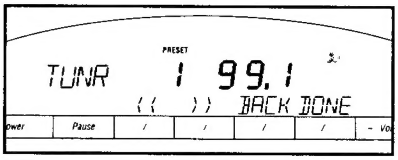
Use the directional keys to select the tracks you wish to program, and with each track selection press MEM to enter the selection into memory. Then to begin programmed play press P-PL. The CD player will then play only those tracks programmed into memory.
NOTE: The program for a given CD is erased when you open the tray.

PROGRAMMING

Programming Tuner Presets
To program Tuner presets first enter the main menu by selecting any of the unmarked buttons. Next press PROG and then select TUNR. The display will read:

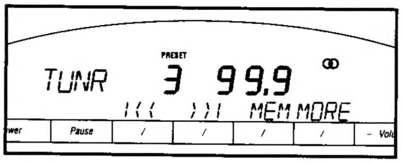


Pressing MORE will change the display to:



Use MORE and BACK to change between these two screens while in the tuner presetting mode.

Using >>| and |<< to SEEK or << and >> to tune manually (See TUNR LSTN functions, above.), tune to a station you wish to memorize. Then, by pressing >>| or |<< for more than two seconds at a time, adjust the displayed preset number to the desired preset between 1 and 19.



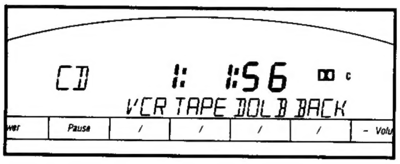
Press MEM (memory) to save that station in that preset number. The preset will automatically be increased by 1 when you press MEM, so you needn't adjust the number manually when memorizing many stations at once.

NOTE: After a period of 10 seconds, Festival will revert to the main menu.

RECORDING

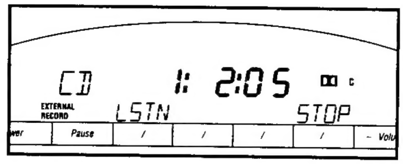
The Festival system gives you considerable flexibility in making recordings. You can record within the system from the tuner or CD player onto the cassette deck. You can also record from a system source to an outboard recorder. You can also record from an outside source onto the system cassette deck. However, when outboard components are involved the process is less automatic.

Before making a recording, you must first select the source you wish to record by entering the LSTN (listen) mode from the main menu, and, of course, you must load a blank cassette in the tape well. Then go back to the main menu and press RCRD (record). The display will read:



Note that TAPE and DOLB will not be lit if you are listening to TAPE. This prevents inadvertently recording over a favorite tape.

Recording to an external recorder
VCR should be selected when recording to an external recorder you've connected to your system. If you're using the system cassette deck to record, you can disregard this section. When you press VCR, EXTERNAL and RECORD will appear in the display to remind you to set up your external component for recording. Also, the STOP command is added to the main menu, so you can stop recording. Finally, PROGRAMMING and RECORDING commands are omitted from the main menu



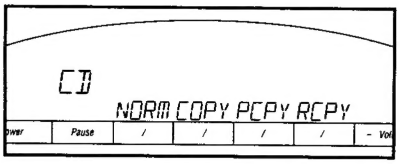
while recording is in progress.
IF YOU HEAR NO SOUND AFTER PRESSING VCR, CHECK THE CONNECTIONS AND SETTINGS OF THE EXTERNAL RECORDER.

Dolby noise reduction is selectable through the DOLB button. Press DOLB once to choose Dolby B type noise reduction, again for Dolby C, and again for no noise reduction. When noise reduction is engaged the DD will be shown on the display along with the letter designation B or C.

BACK takes you back to the main menu.

RECORDING

Recording to the internal cassette
Press TAPE and the display presents you with four recording choices:



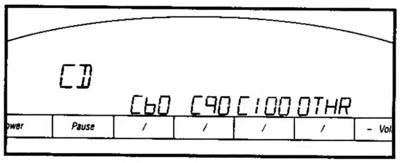
When you select NORM (normal) the cassette deck will begin recording the source immediately.

Select COPY to automatically duplicate a CD onto tape. The tape is wound back to the beginning, and the recording starts at the beginning of track one.
THE COPYING PROCESS CAN ONLY BE INTERRUPTED BY PRESSING THE BUTTON BELOW **STOP** ON THE DISPLAY OR SHUTTING OFF THE POWER.

PCPY (programmed copy) stands for Programmed Copy. It is like COPY, but only the pre-programmed selections are copied. The CD player must have been previously programmed for the current disc.

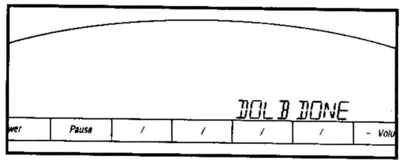
RCPY (random copy) stands for random copy, and it is the same as COPY, except the disc is copied to tape with the songs in random order.

Choosing COPY, PCPY, or RCPY automatically places you in the optional EDIT mode where you are given the following choices:



C60, C90, and C100 refer to 60, 90, and 100 minute tapes respectively.

Festival uses this information during the copying process to record the songs to avoid running out of tape in mid track. If desired, press the button corresponding to the tape you're using, to activate the EDIT feature for this recording. After you have selected a tape length, the display reads:



Pressing DOLB repeatedly cycles you through the choices of Dolby B noise reduction, Dolby C noise reduction, or Dolby noise reduction off. DONE completes the command sequence.

OTHER FRONT PANEL CONTROLS

A hinged door directly below the row of seven pushbuttons conceals secondary controls. Press the top of the gate to lower it and expose the controls.

The SPEAKER button(s) (A and B on the Festival 500) let you turn each pair of speakers off, to listen through headphones or to one speaker pair at a time.

BALANCE adjusts the relative levels of the left and right channels.

TREBLE and BASS are tone controls.

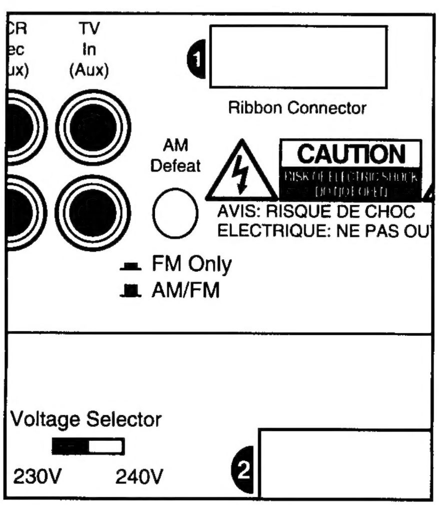
BASS ASSIST should only be used with Festival speakers. It extends low bass response when the button is in.

PHONES is a jack for lightweight stereo headphones. (Use the SPEAKERS button(s) to turn the main speakers off.)

REAR PANEL CONTROLS

AM DEFEAT

This control is located on the tuner back panel. When this button is pressed in, only FM stations may be tuned, although AM presets that were previously memorized may still be called up in the usual way.

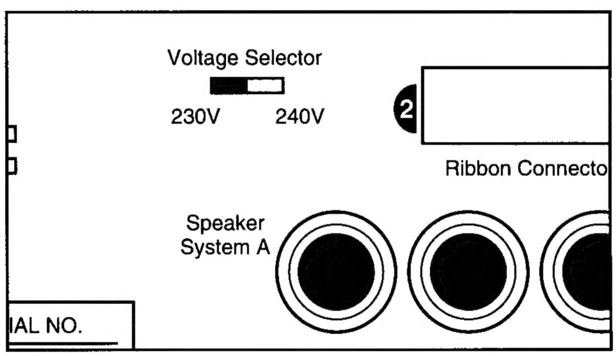


APPENDIX A

CONNECTING ADDITIONAL COMPONENTS TO YOUR FESTIVAL SYSTEM

The TV (Aux)input at the extreme right of the row of phono jacks on the tuner-controller will accept almost any stereo output except for that of a turntable. You can, for instance, connect the audio outputs of a stereo television, a stereo VCR, a laserdisc player, DCC, Mini-Disc, or a satellite receiver. The VCR Rec (Aux) output, which is next to the TV (Aux) input, lets you record from any of the sources comprising the Festival system onto another cassette deck, a hi-fi VCR deck, a Mini-Disc player, or a DCC deck. Keep in mind, however, that if you utilize the VCR Rec (Aux) output, you must initiate the recording from the outboard component. The Festival's system commands cannot control the recording process for any recording device aside from its own cassette deck.

AC VOLTAGE SELECTOR
Export models of the Festival systems have switches permitting the selection of either 230V or 240V AC voltages. This control is located on the integrated amplifier back panel.



CD OUTPUT LEVEL CONTROL

The CD output level is preset at the factory for optimum recording and listening performance. Some advanced users may want to customize this setting. This level control on the CD back panel has three settings: 0 dB—the standard setting, + 1.5 dB, and + 3 dB.

ELECTRICAL PARTS LIST REFERENCE

NOTE : Assignment of common parts codes.

RESISTOR

1118□□□2□	Carbon film resistor, ± 5%, 1/8W
1114□□□2□	Carbon film resistor, ± 5%, 1/4W
	(2) lead type
	(1) resistor value

Examples

(1) Resistor Value

0.47 ohm···478 4.7 ohm···479 68 ohm···680
470 ohm ···471 2.7 Kohm···272 56 Kohm···563

(2) Lead type

PS type ···1 TP type ···5

CERAMIC CAPACITOR

1886□□□□5	Ceramic capacitor
	disc type
	Temp. coeff. P350–N1000, 50V
	(2) tolerance (capacity deviation)
	(1) capacity value

Examples

(1) Capacity Value

4pF ···040 47pF ···470 220pF ···221

(2) Tolerance

±0.25pF ······0 ±0.5pF ······1 ±1pF·········2
±2pF ·········3 ±5pF ·········4 ±10pF·········5
±20% ·········6 +50%–20%···7 +40%–20%···8
+80%–20%······9

MYLAR CAPACITOR

1506□□□41	Mylar capacitor, ±5%, 50V
	(1) capacity value

Examples

(1) Capacity Value

0.00047uF······471 0.0056uF······562 0.047uF······473
0.68uF ······684

ELECTROLYTIC CAPACITOR

142□□□□6□	Electrolytic capacitor, ±5%, 50V
	(3) lead type
	(2) capacity voltage
	(1) working voltage

Examples

(1) Working Voltage

6.3V······1 10V······2 15V······3
25V······4 35V······5 50V······6

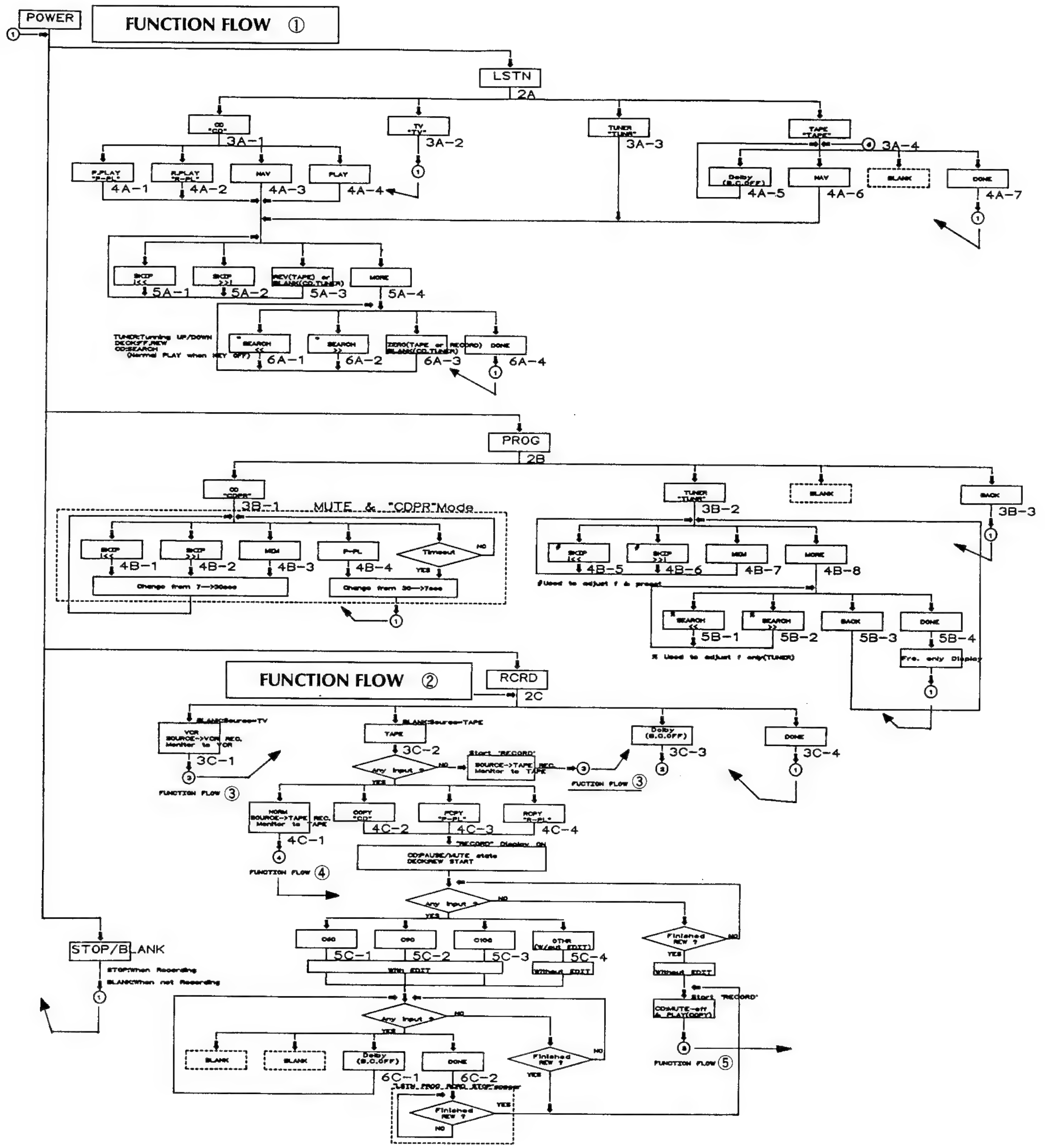
(2) Capacity Value

0.47uF······478 4.7uF······479 33uF······330
470uF······471 2200uF······222

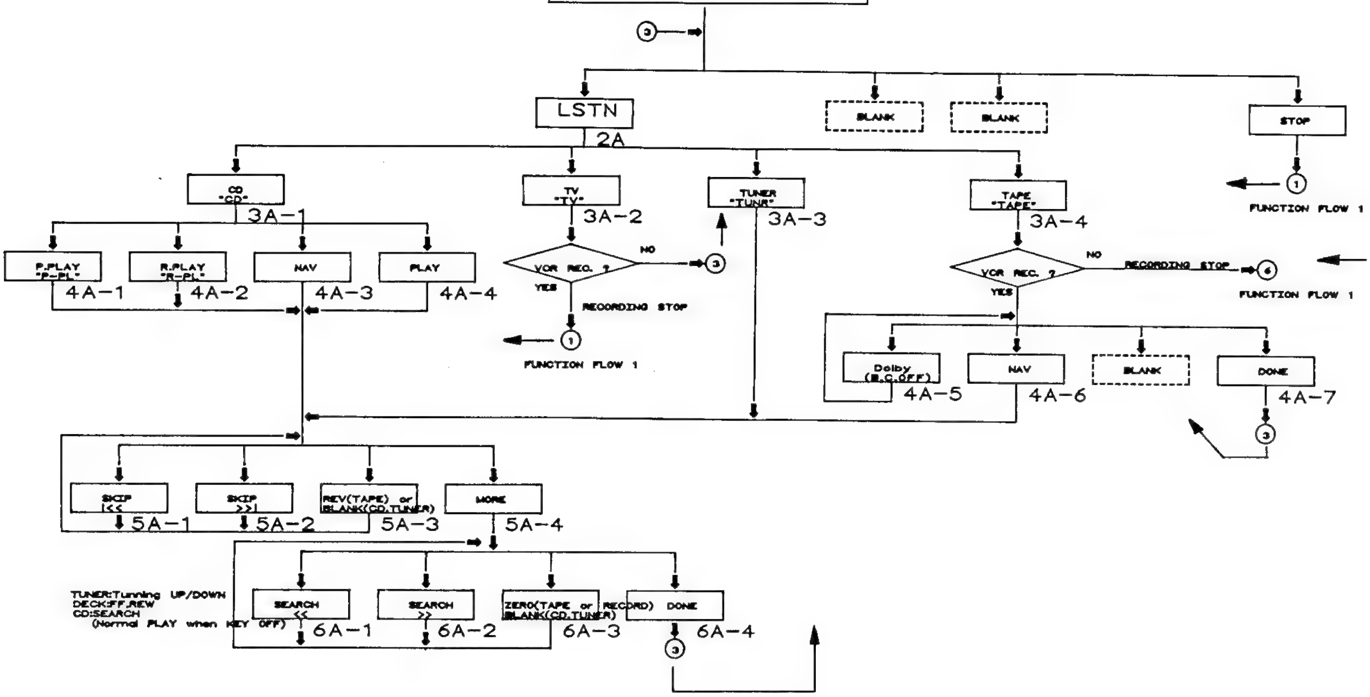
(1) Lead type

A–type······1 A–type TP······2

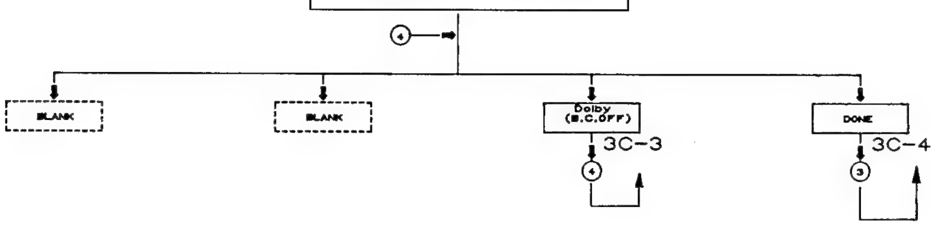
SYSTEM FLOW CHART



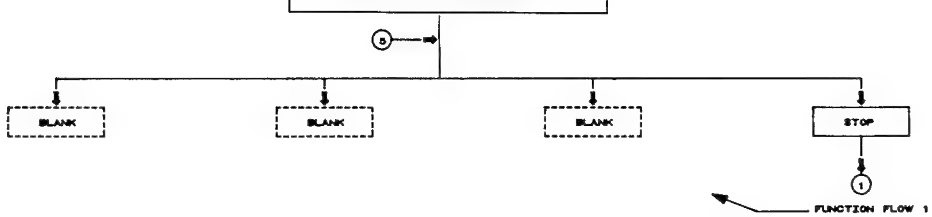
FUNCTION FLOW ③



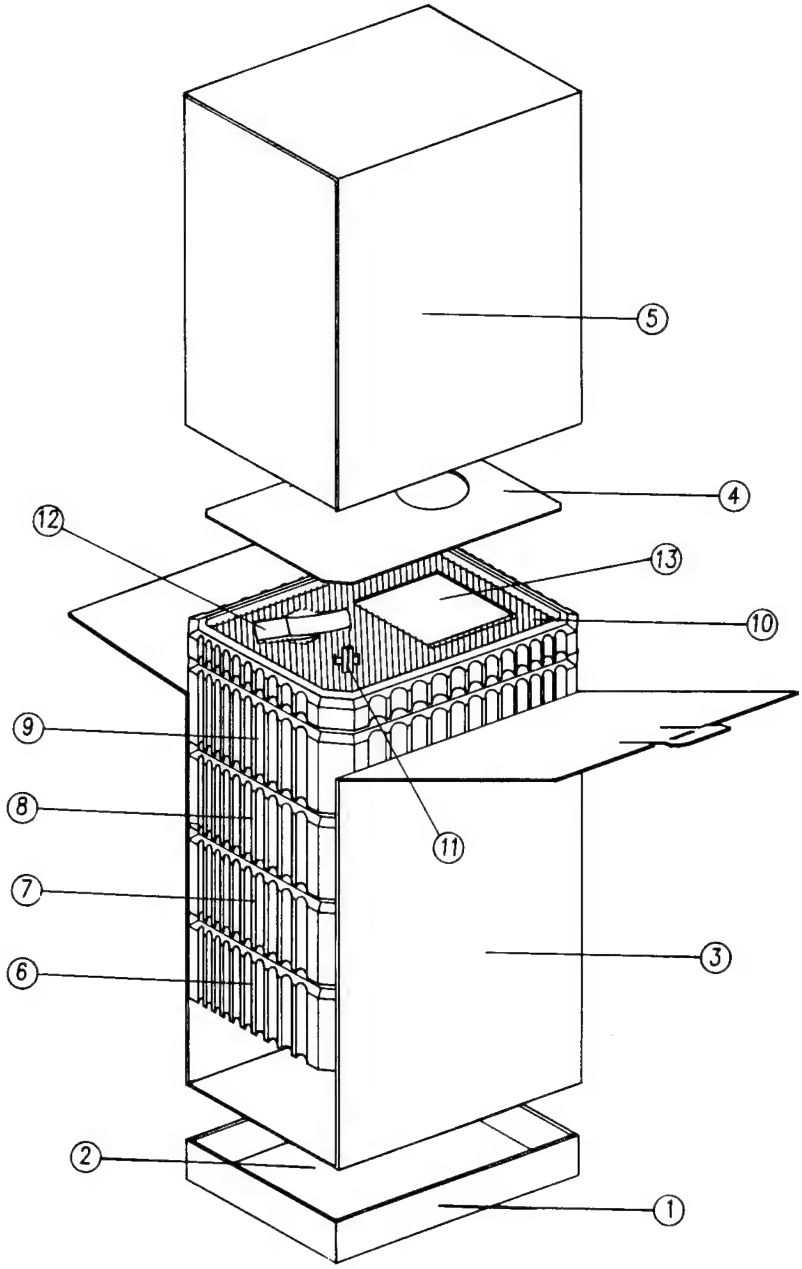
FUNCTION FLOW ④



FUNCTION FLOW ⑤



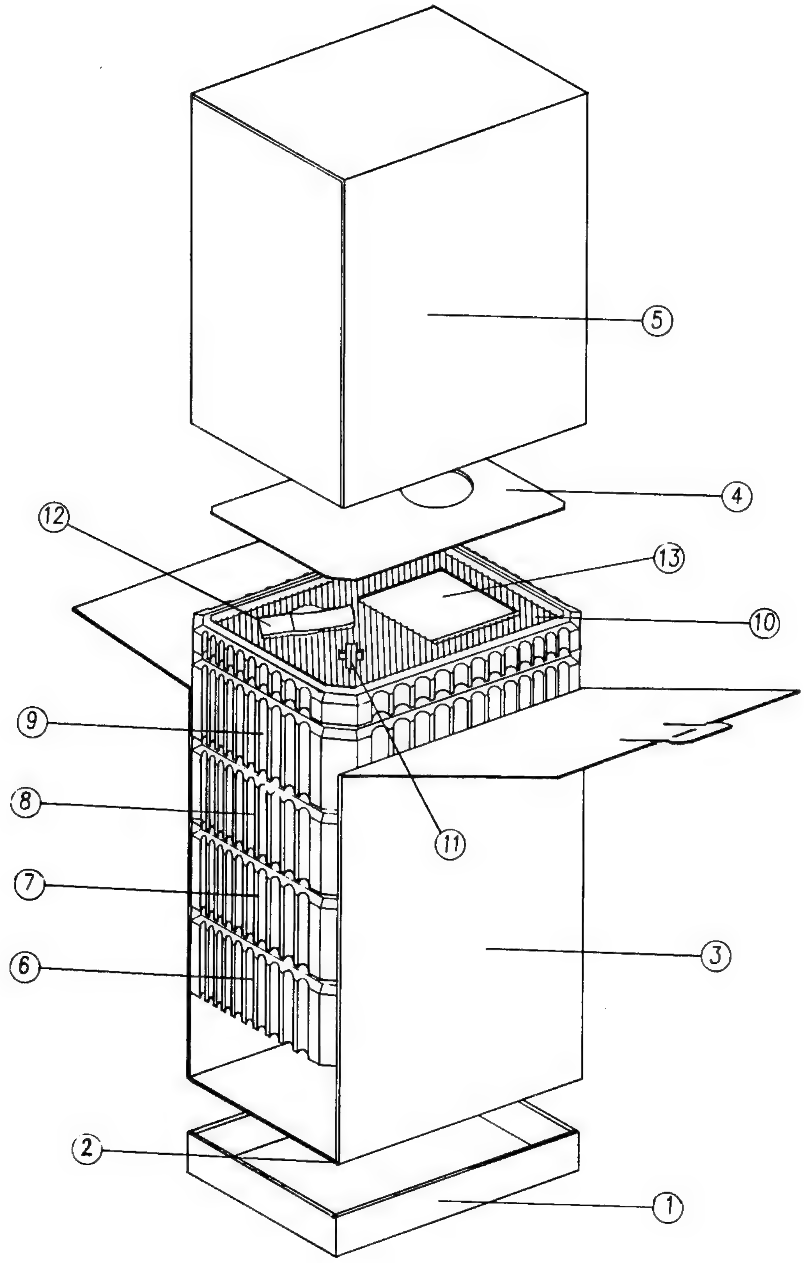
Festival : 300



NO	PARTS NAME	PARTS NO.	Q'TY	REMARK
1	PACKING BASE	3-324-030-01	1	USA,I,IB,BB
2	BASE LID	3-324-031-01	1	USA,I,IB,BB
3	SLEEVE INNER	3-821-103-12	1	USA,I,IB,BB
4	INNER LID	3-324-019-12	1	USA,I,IB,BB
5	CARTON OUT	3-127-815-11	1	I,IB,BB
5	CARTON OUT	3-128-607-11	1	USA
6	CDP ASS'Y	HK-CD300	1	USA,I,IB,BB
7	DECK ASS'Y	HK-C300	1	USA,I,IB,BB
8	TUNER ASS'Y	HK-T300	1	USA,I,IB,BB
9	AMP ASS'Y	HK-A300	1	USA,I,IB,BB
10	PAD UPPER	3-324-018-02	1	USA,I,IB,BB
11	BATTERY ASS'Y	2-154-204-01	1	USA,I,IB,BB
12	REMOCON ASS'Y	A-221-8A0-02	1	USA,I,IB,BB
13	MANUAL	3-128-604-01	1	USA,I,IB,BB

SYSTEM PACKING DRAWING

Festival :500



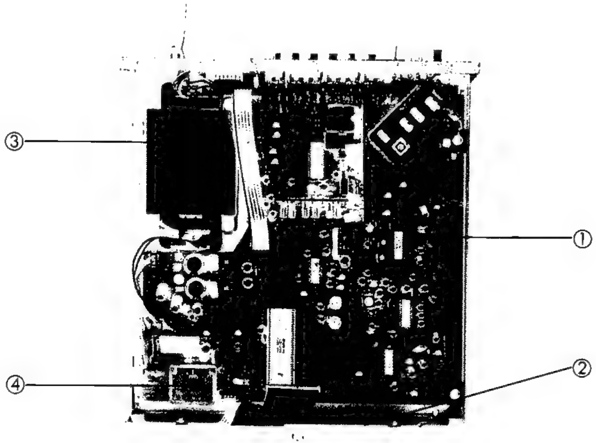
NO	PARTS NAME	PARTS NO.	Q'TY	REMARK
1	PACKING BASE	3-324-030-01	1	USA,I,IB,BB
2	BASE LID	3-324-031-01	1	USA,I,IB,BB
3	SLEEVE INNER	3-821-103-12	1	USA,I,IB,BB
4	INNER LID	3-324-019-12	1	USA,I,IB,BB
5	CARTON OUT	3-127-925-11	1	I,IB,BB
6	CDP ASS'Y	HK-CD500	1	USA,I,IB,BB
7	DECK ASS'Y	HK-C500	1	USA,I,IB,BB
8	TUNER ASS'Y	HK-T300	1	USA,I,IB,BB
9	AMP ASS'Y	HK-A500	1	USA,I,IB,BB
10	PAD UPPER	3-324-018-02	1	USA,I,IB,BB
11	BATTERY ASS'Y	2-154-204-01	1	USA,I,IB,BB
12	REMOCON ASS'Y	A-221-8A0-02	1	USA,I,IB,BB
13	MANUAL	3-128-604-01	1	USA,I,IB,BB

TUNER SECTION

1 TUNER

INTERNAL VIEW

■ TOP VIEW



① PCB-1 Main p.c.board
② PCB-2 Control p.c.board
③ Power trans(main)
④ Power trans(sub)

DISASSEMBLY PROCEDURES

1 TOP Cover Removal

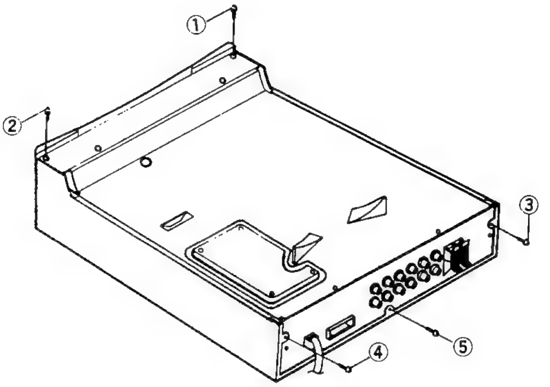


Fig. 1

1. Remove screws ① to ⑤ in Fig. 1
2. Remove the top cover.

2 Rear Panel Removal

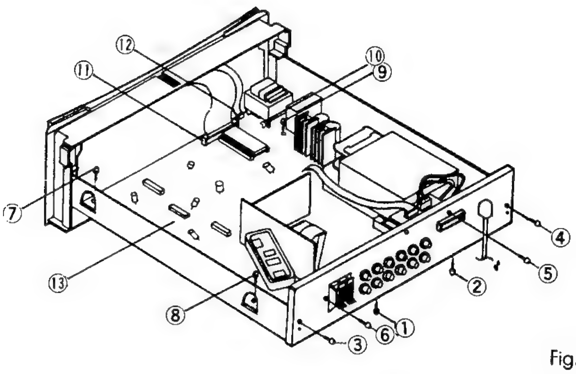


Fig. 2

1. Remove screws ① to ⑥ in Fig. 2, and then remove the rear panel.

3 PCB-⑬ (Main PCB) Removal.

1. Remove the rear panel in Fig. 2(Refer to step 2)
2. Remove connectors ⑪ to ⑫ in Fig. 2, and then remove pcb supports ⑩
3. Remove screws ⑦ to ⑨ in Fig. 2, and then remove the maim pcb⑬

4 Front Panel Assembly Removal

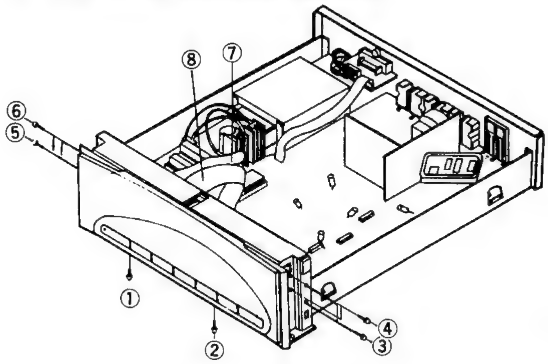


Fig. 3

1. Remove connectors⑦ to ⑧ in Fig. 3
2. Remove screws ① to ⑥, and then remove the front panel assembly from the unit in Fig. 3

5 PCB-⑥ (Control PCB) Removal.

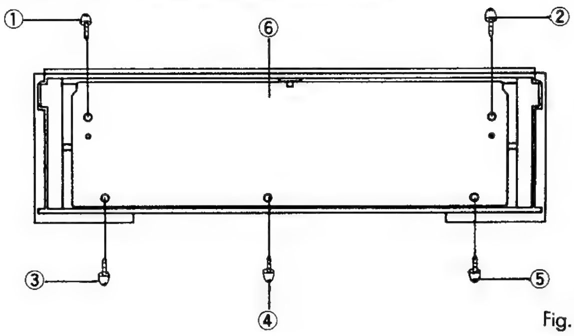


Fig. 4

1. Remove the front panel assembly in Fig. 3. (Refer to step 4)
2. Remove screws ① to ⑤ in Fig. 4, and then remove the control pcb ⑥

Tuner

Condition:Set the volume control maximum
*:Only USA version

FM Section

- Set the FM mode by pressing the directional keys to tune up and down the bands.
- Connect the FM signal generator (FM SG) to the FM antenna 75 (* 300) ohm terminal through the 75(*300) ohm dummy Antenna.
- Set the Tuner to the FM band

1) Tune the FM SG to the Tuner.
2) connect the FM multiplex stereo signal generator to the FM SG external Modulation terminal
3)

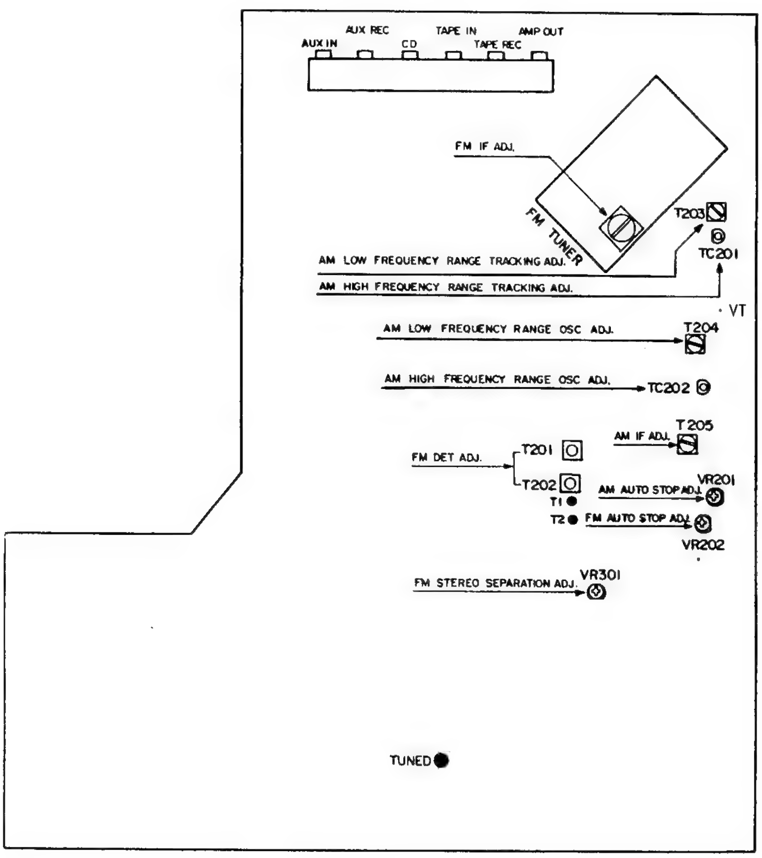
FM signal generator	1 kHz, 40 kHz deviation *1 kHz, 75 kHz deviation
Stereo modulator	L + R = 22.5(%), L-R = 22.5(%), 19 kHz = 8(%) * L + R = 45.5(%), L-R = 45.5(%), 19 kHz 9(%)

Step	FM SG(*3)		Tuner Frequency Display	Adjustment Location	Adjustment procedure
	Frequency	Level			
1	No signal		87.5 MHz		Confirm that 1.9V DC±0.5V between terminal V_T and Ground.
2	No signal		108.0MHz		Confirm that 8.0V DC±0.5V between terminal V_T and Ground.
3	98.0 MHz	72 dBf		T 201 T 202	Adjust until the DC voltage is OV±5mV at between TP_1 and TP_2 Adjust until distortion at output L or R terminal is minimum.
4					Repeat steps 3 for optimum the DC voltage and minimum THD
5	98 MHz set to stereo	72 dBf	98.0 MHz	I.F (within±90°)	Adjust until Distortion at output L or R terminal is minimum.
6	98 MHz	38 dBf ±3 dBf *32 dBf ±3 dBf	98.0 MHz	VR 202	Adjust VR202 TEST POINT TUNED become OV at 38 dBf (*32dBF)
7	98 MHz set to stereo	72 dBf	98.0 MHz	VR 301	Adjust until stereo separation at output L or R terminal is maximum.

AM Section

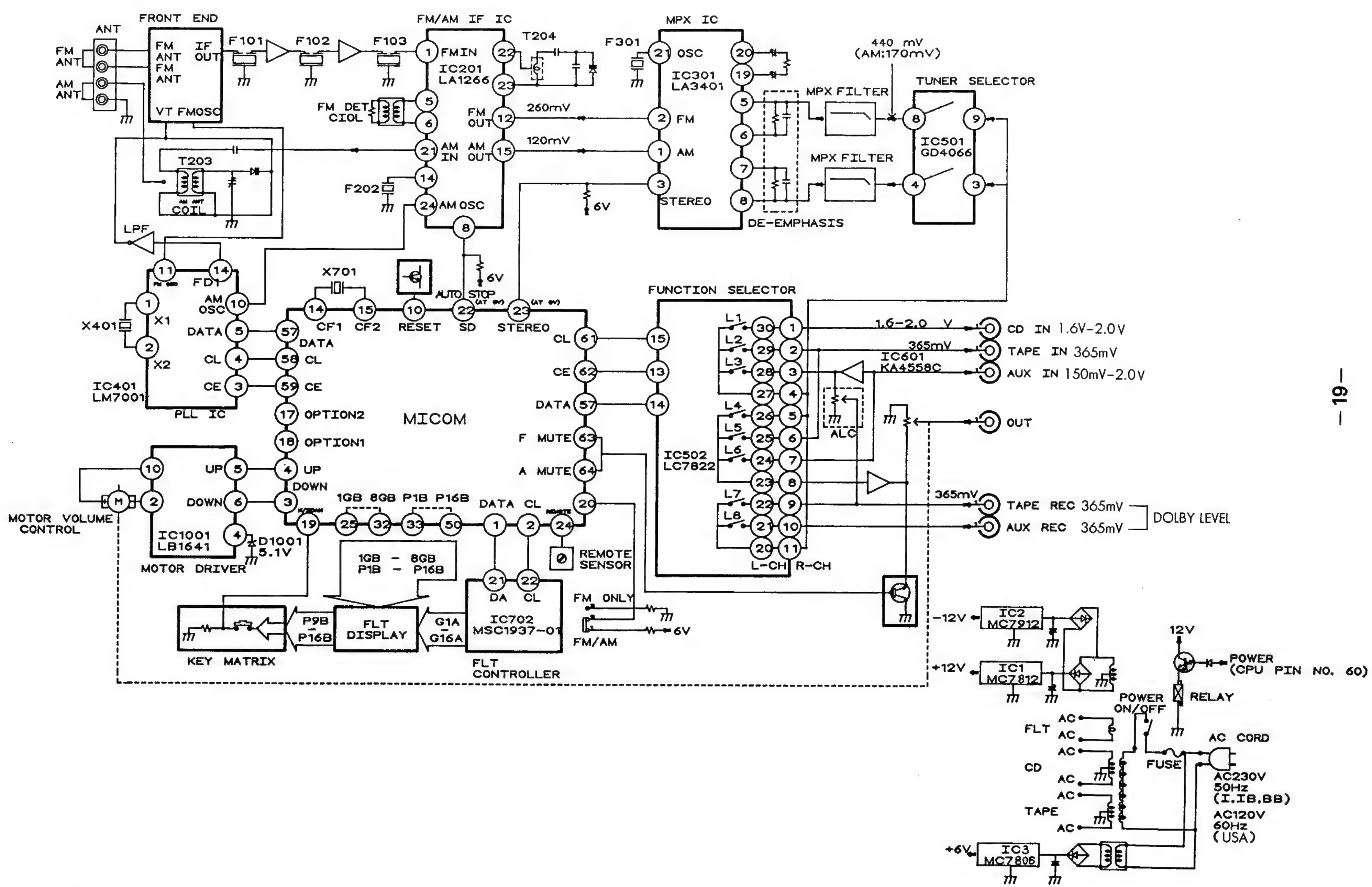
- Connect the furnished AM loop antenna between terminals AM ANTENNA and GND.
- Connect the AM signal generator(AM SG) to the AM Antenna terminal

Step	AM SG 1 kHz 30% modulation Frequency	AM SG 1 kHz 30% modulation Level	Tuner Frequency Display	Adjustment Point	Adjustment procedure
1	No signal		522 kHz *(520 kHz)	T 204	1.0 V DC between terminal V_T and GND.
2	No signal		1611 kHz * (1710 kHz)	TC 202	8.0V DC between terminal V_T and GND.
3	Repeat steps 1 and 2for optimun voltage				
4	603 kHz * (600 kHz)	60 dB μ	603 kHz * (600 kHz)	T 203	Adjust until maximum Sensitivity is obtained
5	1395 kHz * (1400 kHz)	60 dB μ	1395 kHz * (1400 kHz)	TC 201	
6	999 kHz * (1000 kHz)	60 dB μ	999 kHz * (1000 kHz)	T 205	
7	999 kHz * (1000 kHz)	50 dB μ ± 7 dB	999 kHz * (1000 kHz)	VR 201	Adjust VR201 until TEST POINT "TUNED" becomes OV at 50dBμ



Tuner : Adjustment point

TUNER BLOCK DIAGRAM



Tuner

■ FM TUNER SECTION

The FM signal which has entered through the antenna is high-frequency amplified in the front end. Then it is mixed with the output of the local oscillators and converted into the 10.7 MHz intermediate-frequency.

The 10.7 MHz signal is amplified in the intermediate-frequency amplifying section which consist of F101, Q101, Q102, F102, Q103 and F103 and fed to pin 1 of IC201. In IC201, the signal is sent through the IF amplifier and after being detected in the quadrature, it is sent through the post amplifier to pin 12 and then input to pin 2 of IC301. In IC301, the pilot signal is detected and the 38 KHz signal is produced. Then by this signal, stereo signal is demodulated, output from pin 6 for the left channel and from pin 8 for the right channel and transmitted to the input selector section.

■ AM TUNER SECTION

The AM signal which has entered through the antenna passes through the tuning circuit consisting of T203 and is inputted to pin 21 of IC201. Tn IC201, it undergoes radio-frequency amplification and local oscillation and is output from pin 20, and passed through the transformer (T205) and ceramic filter (F201) and enters pin 18 of IC201. It is then passed through the IF amplification and detection and is output from pin 15. This signal is fed to IC301.

■ SYNTHESIZER SECTION

* FM

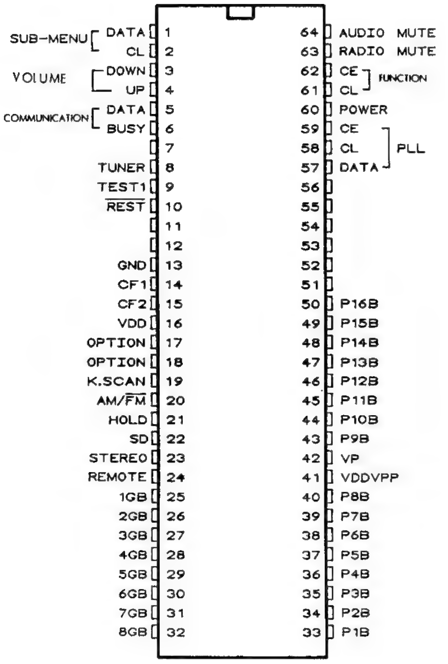
The local oscillator output from the front end is fed to pin11 of the prescaler IC401 and after being frequency devided into 34 or 32, control output is fed from IC701, compared with the devided local oscillator frequency and output to pin 14. This voltage is level converted by Q401 and Q402, and fed to the front end.

* AM

The local oscillation output is fed from pin 24 of IC201 to pin 10 of IC401. In IC401, control output signal is fed from IC701, compared with the local oscillator frequency and output to pin 14. This voltage is level converted by Q401 and Q402, and fed to the AM local oscillator section.

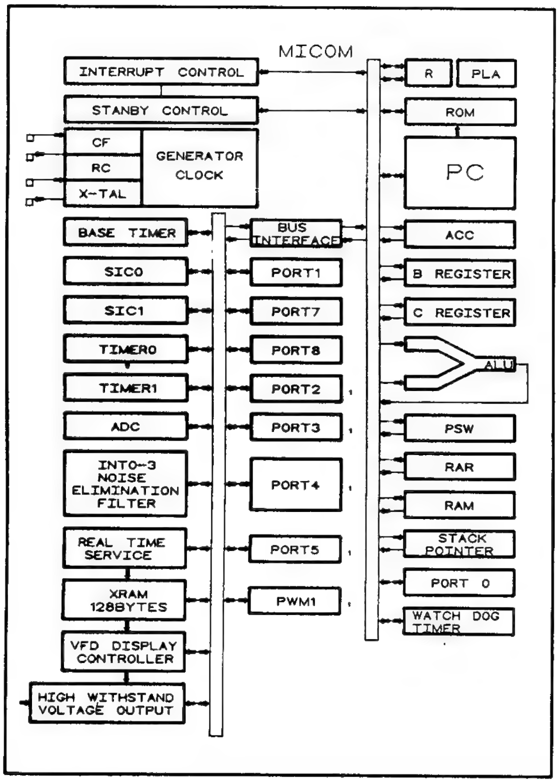
IC FUNCTION BLOCK DIAGRAM

IC701 : MICRO-COMPUTER



MICOM IC TERMINAL FUNCTION TABLE

LE 1044 TERMINAL NAME	No.	INPUT/ OUTPUT	Function Description
DATA	1	OUTPUT	FLT SUB-MENU
CL	2	OUTPUT	
DOWN	3	OUTPUT	VOLUME
UP	4	OUTPUT	
DATA	5	INPUT	REMOCON
BUSY	6	OUTPUT	
—	7	OUTPUT	
TUNER	8	OUTPUT	FOR TUNER FUNCTION
TEST1	9	OUTPUT	Test Terminal(Use with open)
REST	10	INPUT	Reset Terminal
—	11	INPUT	
—	12	OUTPUT	
GND	13	—	GND
CF1	14	OUTPUT	CONNECT QUARTZ OSCILLATOR
CF2	15	OUTPUT	CONNECT QUARTZ OSCILLATOR
VDD	16	—	Power supply + terminal
OPTION	17	INPUT	8bit Input port
OPTION	18	INPUT	
K.SCAN	19	INPUT	
AM/FM	20	INPUT	
HOLD	21	INPUT	8 bit Input port
SD	22	INPUT	
STEREO	23	INPUT	
REMOTE	24	INPUT	
1GB	25	OUTPUT	FLT Display Controller(GRID)
2GB	26	OUTPUT	
3GB	27	OUTPUT	
4GB	28	OUTPUT	
5GB	29	OUTPUT	
6GB	30	OUTPUT	
7GB	31	OUTPUT	
8GB	32	OUTPUT	
P1B	33	OUTPUT	FLT Display Controller (Segment)
P2B	34	OUTPUT	
P3B	35	OUTPUT	
P4B	36	OUTPUT	
P5B	37	OUTPUT	
P6B	38	OUTPUT	
P7B	39	OUTPUT	
P8B	40	OUTPUT	
VDD	41	—	Power Supply
VP	42	—	Power Supply − (Negative)
P9B	43	OUTPUT	FLT Display Controller (Segment)
P10B	44	OUTPUT	
P11B	45	OUTPUT	
P12B	46	OUTPUT	
P13B	47	OUTPUT	
P14B	48	OUTPUT	
P15B	49	OUTPUT	
P16B	50	OUTPUT	
—	51	—	
—	52	—	
—	53	—	
—	54	—	
—	55	—	
—	56	—	
DATA	57	OUTPUT	PLL Data
CL	58	OUTPUT	
CE	59	OUTPUT	
POWER	60	OUTPUT	Power on/off for remocon
CL	61	OUTPUT	Function Selector
CE	62	OUTPUT	
RADIO MUTE	63	OUTPUT	MUTE FOR RADIO
AUDIO MUTE	64	OUTPUT	MUTE FOR AUDIO



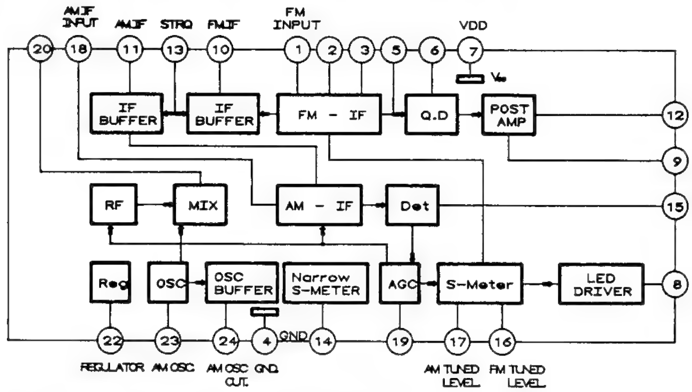
IC 701 OPTION SELECTION

OPTION1 (PIN NO.18)	OPTION2 (PIN NO.17)	BAND RANGE
H	H	FM 76.0MHz − 90.0 MHz :100KHz STEP AM 522 KHz − 1629 KHz : 9KHz STEP
H	L	FM 87.5MHz − 107.9 MHz :200KHz STEP AM 520 KHz − 1710 KHz :10KHz STEP
L	H	FM 87.5MHz − 108.0 MHz :100KHz STEP AM 520 KHz − 1710 KHz :10KHz STEP
L	L	FM 87.50MHz− 108.00MHz :50KHz STEP AM 522 KHz − 1629 KHz :9KHz STEP

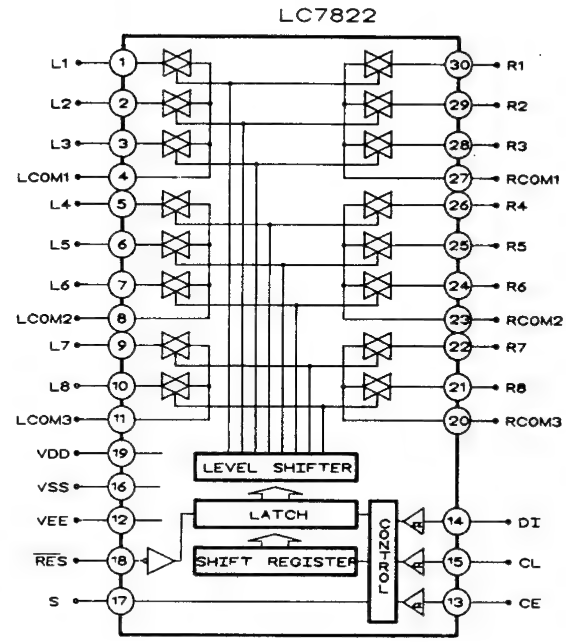
IC 502 FUNCTION SELECTION CHART

MODE SELECTION \ OPERATION PIN		IC502 LC7822 L1	L2	L3	L4	L5	L6	L7	L8	IC501 GD4066B
LESTEN MODE	TUNER				ON					ON
	CD	ON			ON					OFF
	TAPE					ON				OFF
	AUX						ON			OFF
RECORD MODE	TUNER ➡ TAPE					ON		ON		ON
	CD ➡ TAPE	ON				ON		ON		OFF
	AUX ➡ TAPE			ON		ON		ON		OFF
	TUNER ➡ AUX						ON		ON	ON
	CD ➡ AUX	ON					ON		ON	OFF
	AUX ➡ AUX		ON				ON		ON	OFF

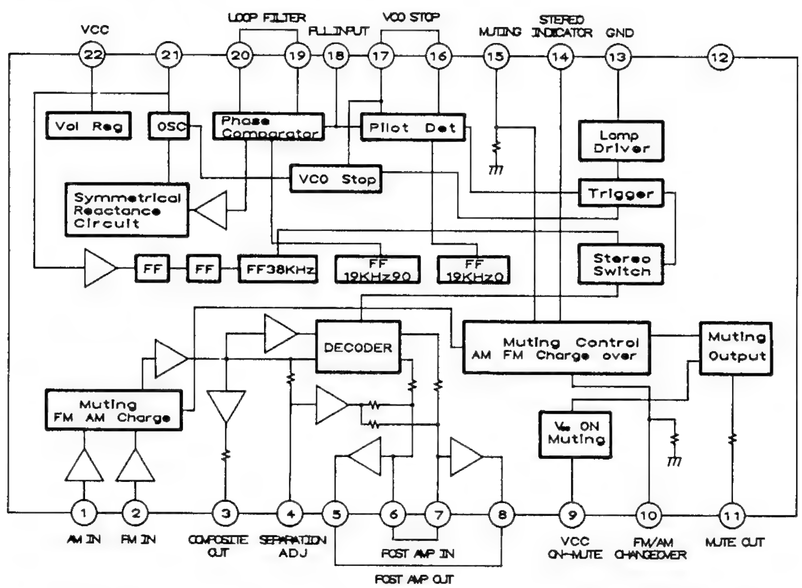
IC201 : LA1266 FM/AM DETECTOR



IC502 : LC7822 FUNCTION SELECTOR

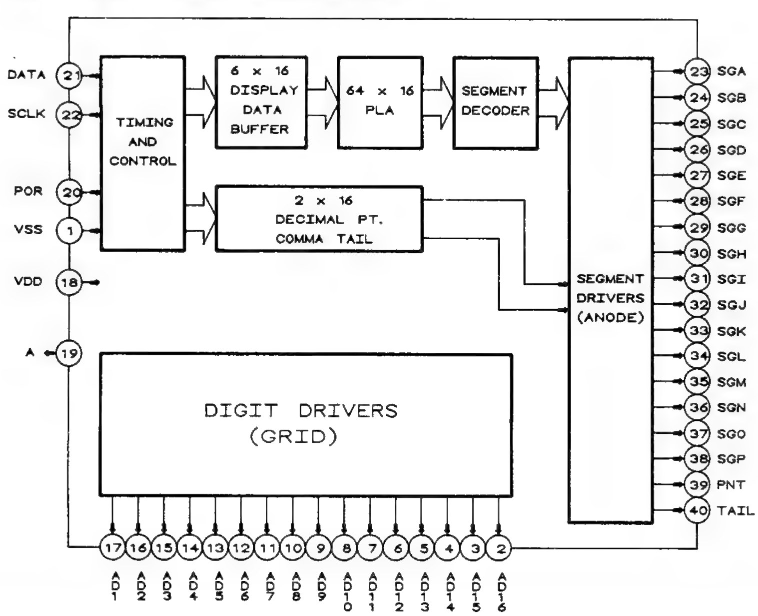


IC301 : MULTIPLEX LA-3401

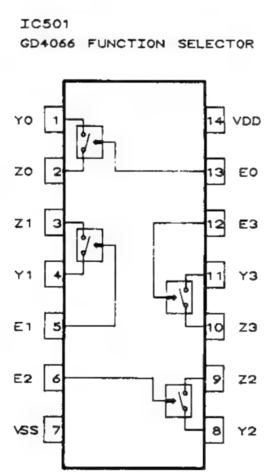


IC702 : MSC 1937-01

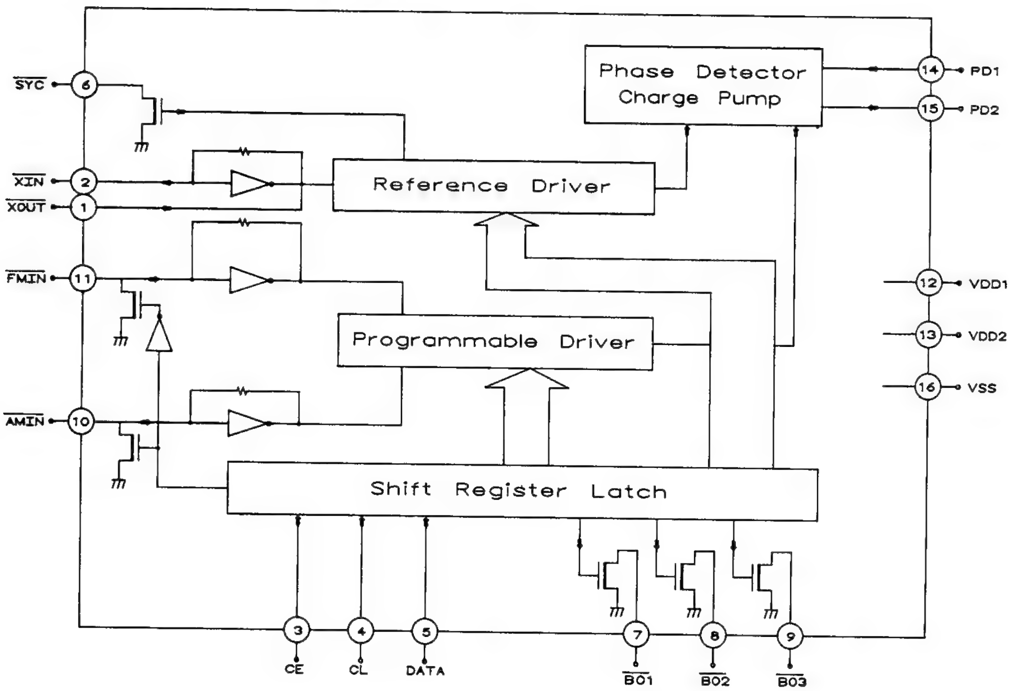
FLT SUB MENU INDICATOR



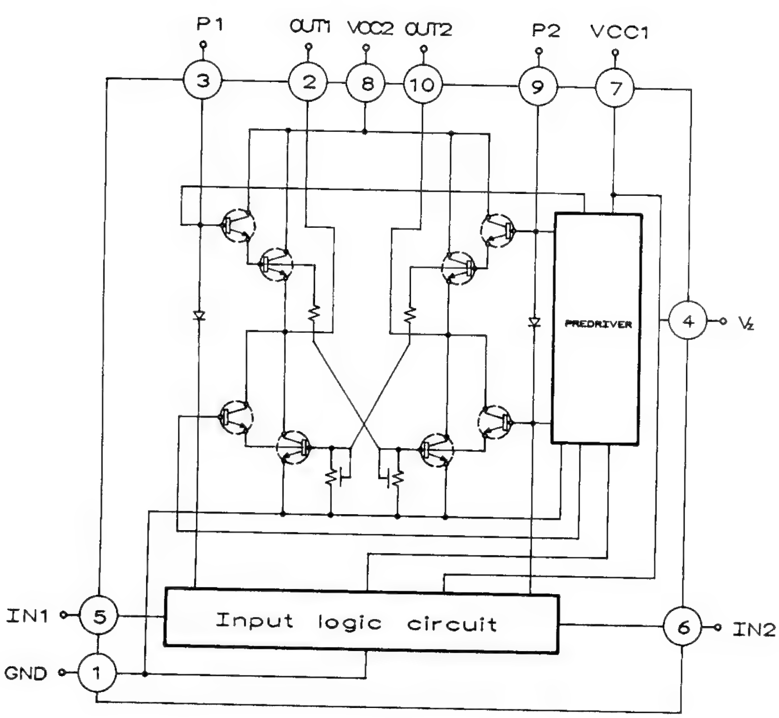
IC501 : GD4066 FUNCTION SELECTOR



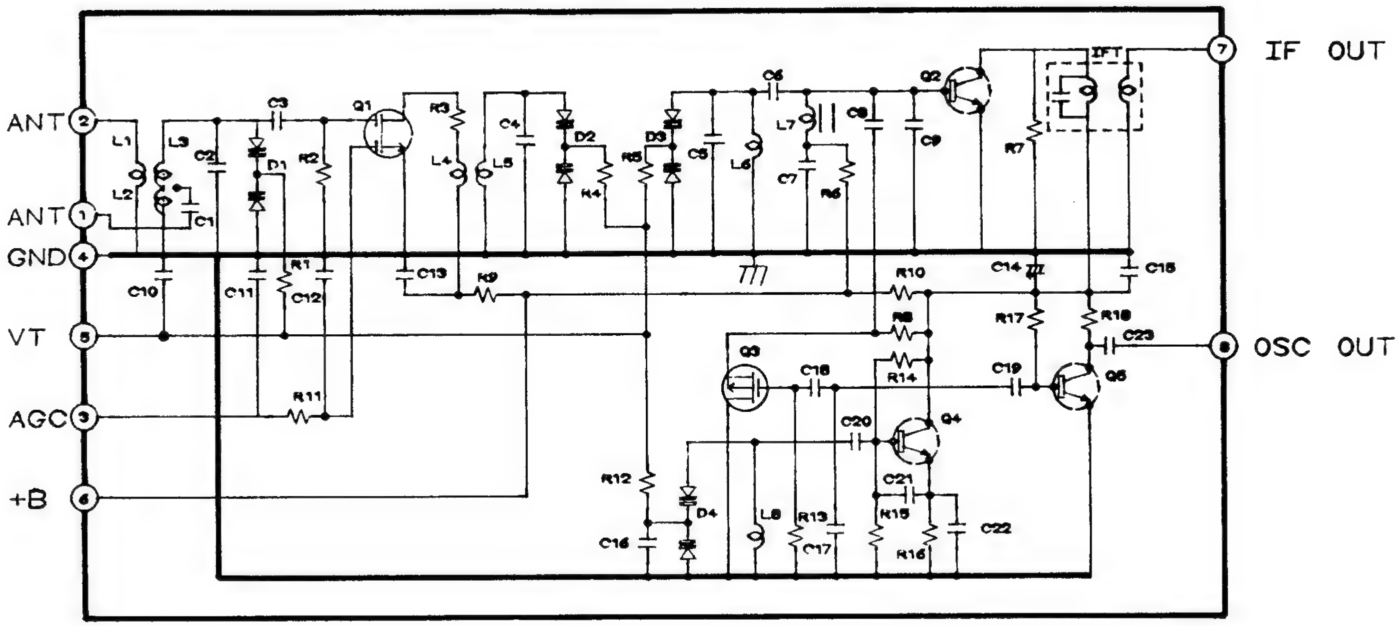
IC401 : LM 7001 PRESCALER



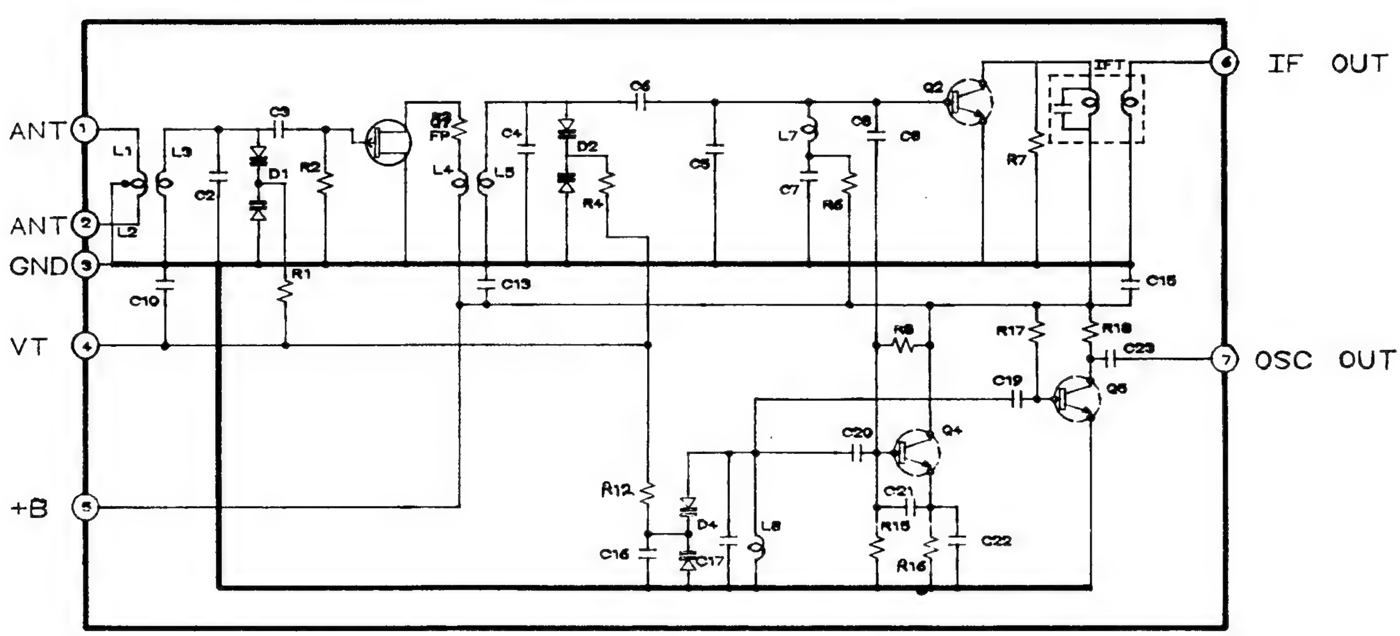
IC1001 : LB1641 MOTOR DRIVE



1. FM FRONT. END(I. IB. BB)
FTH 4-560H



2. FM FRONT. END(USA)
FTH 3-502H

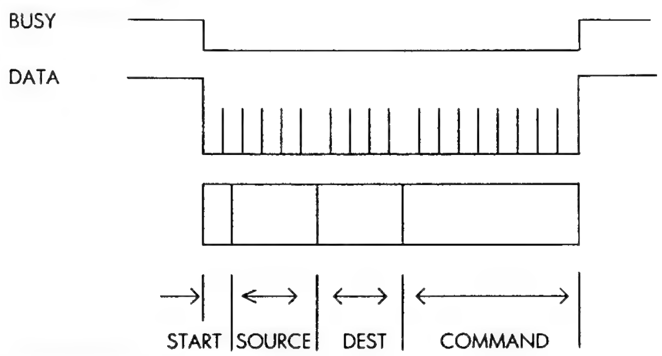


TIMING CHART

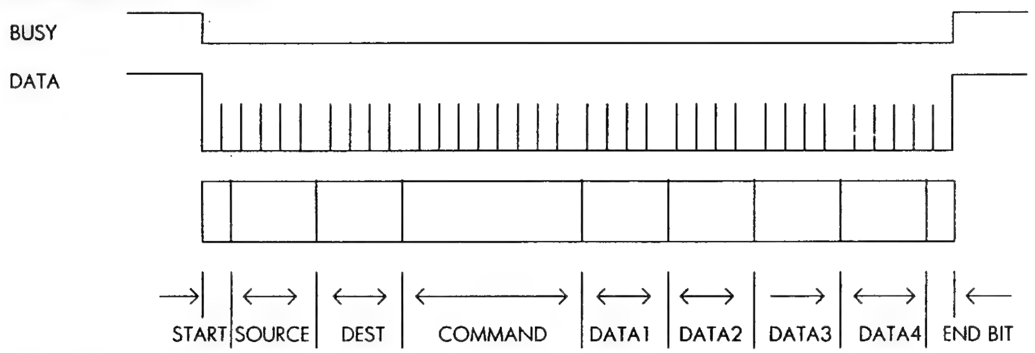
1. System Control Timing Format

Time Base is 560μs

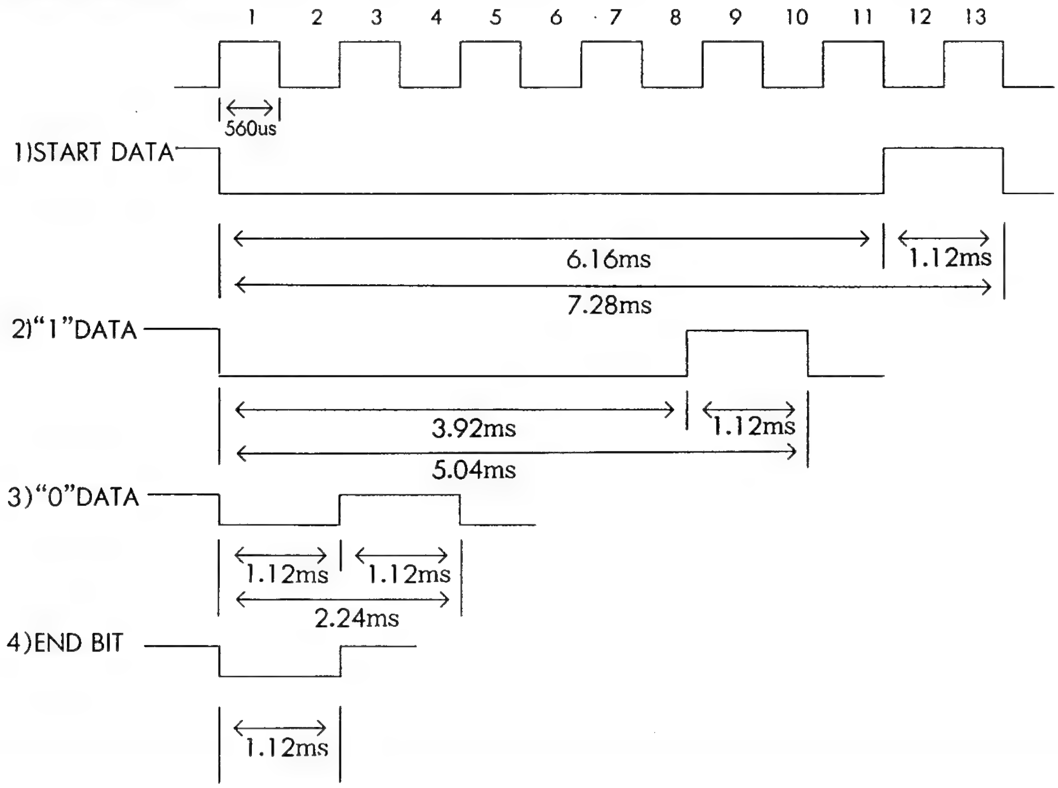
1) COMMAND



2) COMMAND + DATA

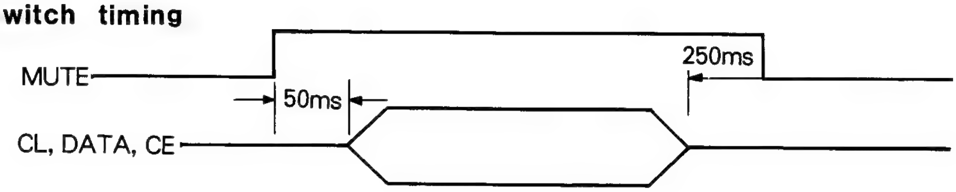


3) BIT WAVEFORM

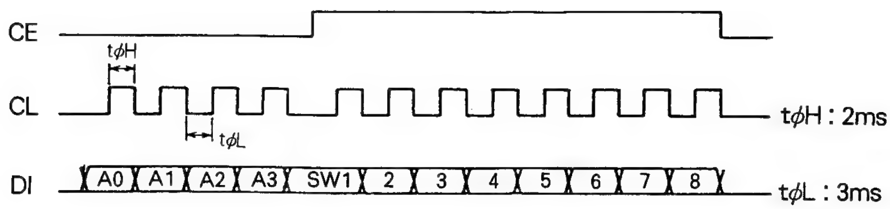


Tuner :

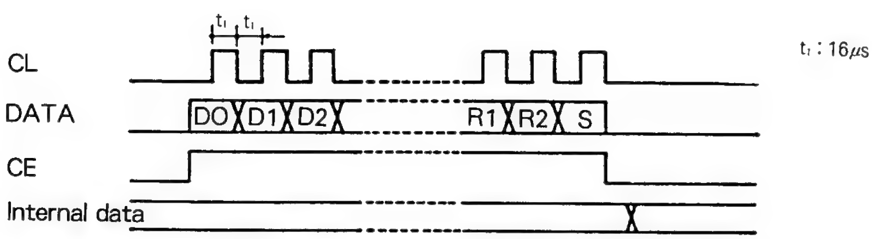
Function switch timing



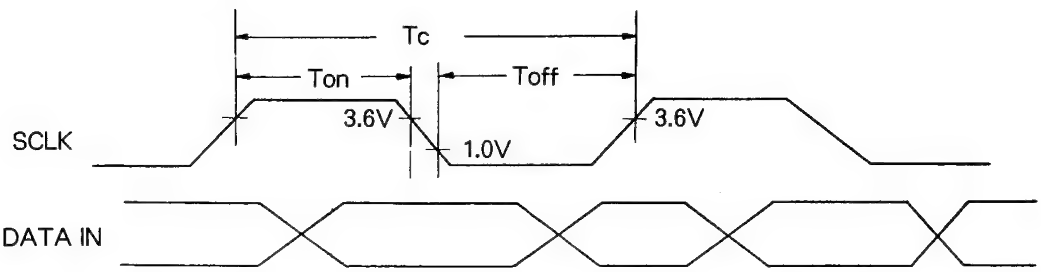
CE, CL, DI waveforms



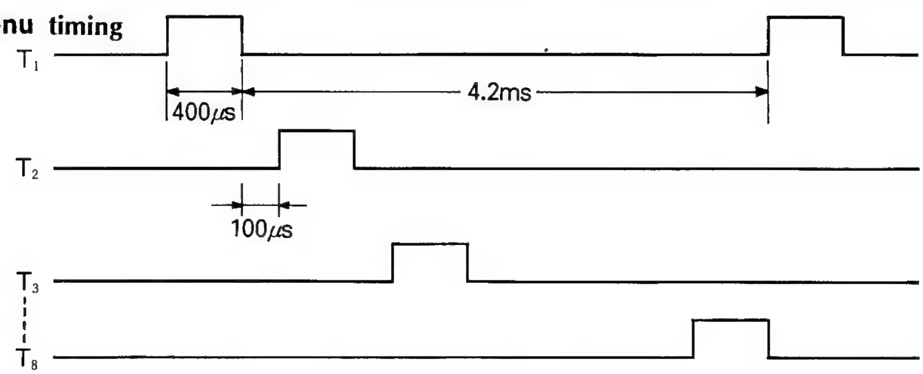
PLL control timing



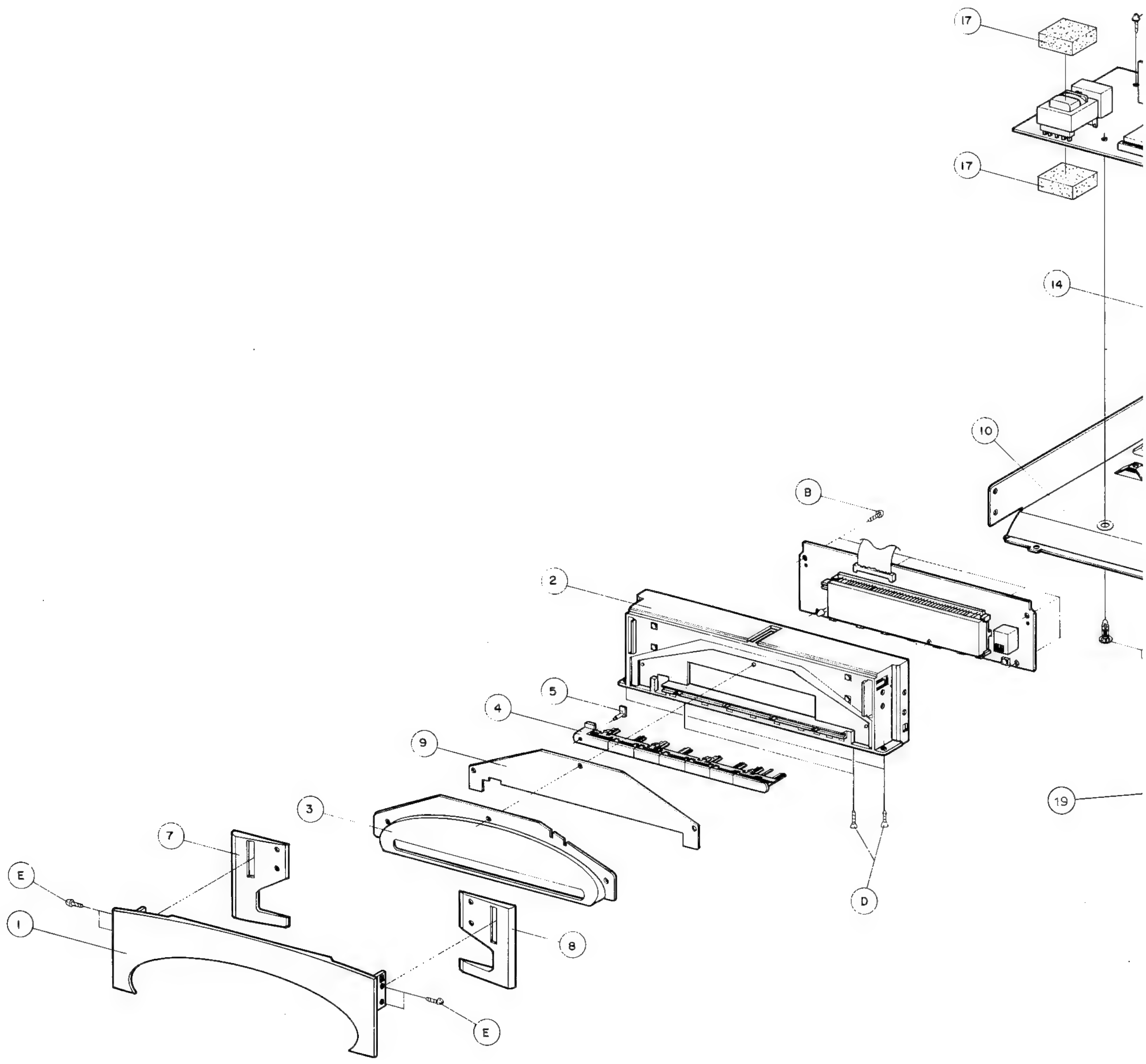
FLT sub menu control timing

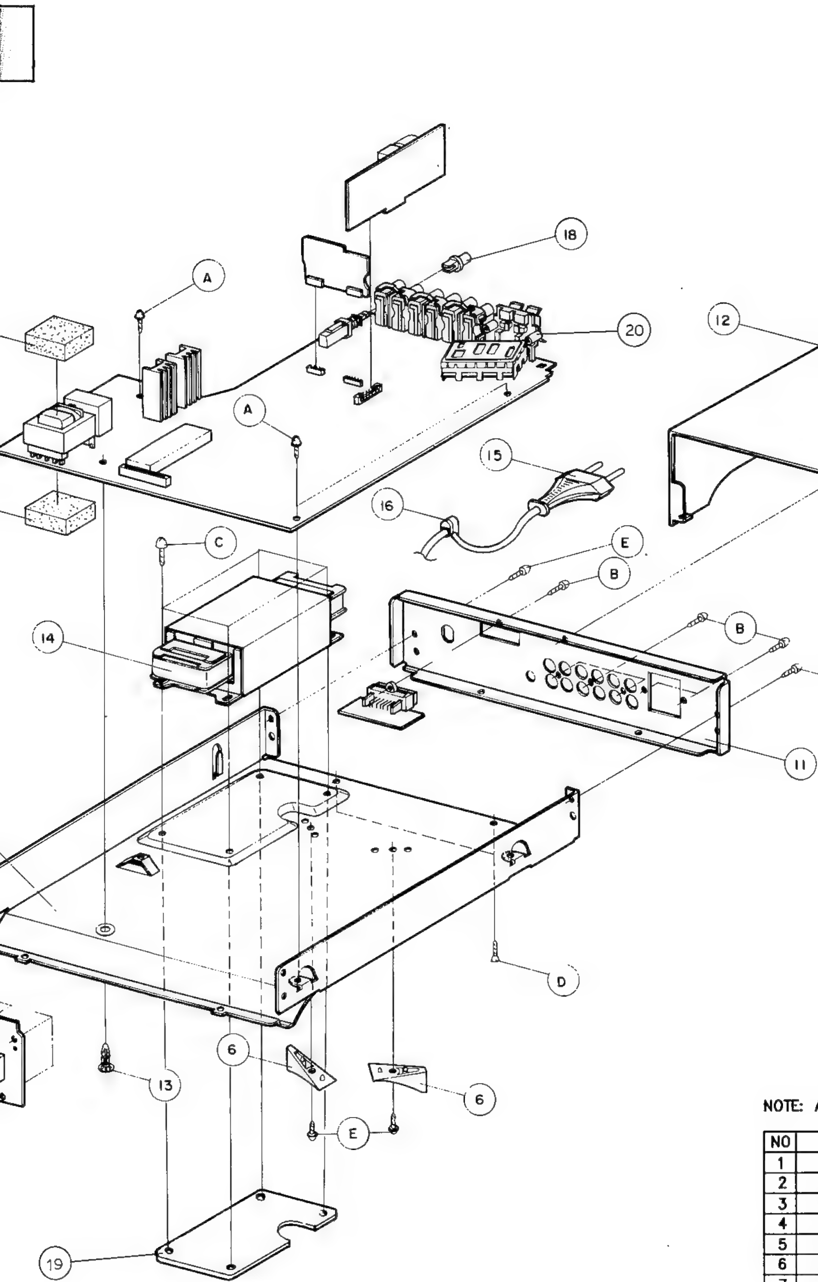


FLT Main menu timing



Tuner





NOTE: A=(USA), B=(I,IB,BB)

NO	PARTS NAME	PARTS NO	MATERIAL	Q'TY	REMARK
1	PANEL FRONT	3-221-801-01	AL A6063-T5	1	A,B
2	PANEL BASE	3-221-802-01	ABS-720 BLACK	1	A,B
3	PANEL WINDOW	3-221-803-01	PMMA	1	A,B
4	KNOB FUNCTION	3-221-805-01	ABS-720 94-HB	1	A,B
5	LENS (A)	3-123-311-01	PMMA 60N	1	A,B
6	GUIDE FOOT	3-221-806-01	ABS-720	2	A,B
7	FOOT L	3-221-807-01	AL A6063-T5	1	A,B
8	FOOT R	3-221-808-01	AL A6063-T5	1	A,B
9	FILTER	3-221-814-01	PVC T0.5 WINE COLOR	1	A,B
10	CHASSIS MAIN	3-221-809-02	SECC T1.0	1	A,B
11	PANEL REAR	3-222-101-02	SECC T0.8	1	A
11	PANEL REAR	3-221-810-01	SECC T0.8	1	B
12	CASE BONNET	3-221-811-01	SECC T0.8	1	A,B
13	SUPPORT PCB	3-810-518-01	NYLON 66	1	A,B
14	POWER TRANS	2-131-491-01	120V 60Hz. DC(+,-) 18V	1	A
14	POWER TRANS	2-131-490-01	230V 50Hz. DC(+,-) 18V	1	B
15	CORD AC	2-221-124-02	NDG-023-0	1	A
15	CODR AC	2-211-109-02	NDG-009-0,VDE	1	B
16	BUSHING S/RELIEF	8-201-118-01	HEYCO SR15-1	1	A
16	BUSHING S/RELIEF	8-201-117-01	HEYCO SR14-1	1	B
17	CUSHION CHASSIS	3-810-333-01	RUBBER	2	A,B
18	KNOB PUSH	3-127-802-01	ABS-720	1	A,B
19	COVER SCREW	3-127-802-01	EVA GRAY T5.5X102X66	1	A,B
20	TERMINAL ANT	8-201-118-01	4P BLACK	1	A
20	TERMINAL ANT	2-155-742-01	75 OHM PAL+AM	1	A
A	SCREW	7-344-408-01	ATZ30P080FZK	3	A,B
B	SCREW	7-764-410-01	VBZ30P100FZK	6	A,B
C	SCREW	7-768-420-01	VBZ40P200FZK	4	A,B
D	SCREW	7-464-408-01	CBZ30P080FZK	6	A,B
E	SCREW	7-764-408-01	VBZ30P080FZK	21	A,B

ELECTRICAL PARTS LIST

TUNER T300

REF. No	Part No.	Description
▶: I, IB BB	※: USA	⚠: SAFETY RELATED PARTS.
	PCB-1 MAIN P.C. BOARD	
	INTERGRATED CIRCUITS	
IC701	2600154011	LE1044, LC866012 CPU(μ-COM)
IC201	2441331721	LA1266 AM.FM IF DET.
IC401	2441330721	LM7001
IC301	2441353721	LA3401 MPX
IC1001	2441348721	LB1641 MOTOR DRIVER
IC502	244136172	LC7822 FUNCTION SELECTOR
IC501	244080731	GD4066B FUNCTION SELECTOR
⚠ IC1	244121771	MC7812 REGULATOR (+12V)
⚠ IC2	244123171	KA7912 REGULATOR (-12V)
⚠ IC3	244143842	KA7806 REGULATOR (+6V)
	TRANSISTORS	
Q403, 405, 500	240011835	KTA1266
Q402	240211815	KTC3200
Q101, 102, 103	240210125	KTC3192
▶ Q201	240211135	KTC3198
Q601, 602, 603, 604, 701	240211135	KTC3198
Q2002	240610715	KSR2001
Q1, 2001	240610815	KSR1001
	FIELD EFFECT TRANSISTOR	
Q401	2404111451	2SK246Y
	DIODES	
D201, 202	2415080911	SVC321 SPA-D(VAR1-CAP)
⚠ D1, 2, 3, 4, 5, 6, 7, 8, 9, 10	2413581651	1N4003L
⚠ D11	242122035	IN 969B, 22V ZENER
D12	242108245	IN 756A, 8.2V ZENER
D402, 403	242110035	IN 758A, 10V ZENER
D1001, 501, 502	242105135	IN 751A, 5.1V ZENER
D401	242105655	IN 752A, 5.6V ZENER
※ D3001, 3002	241017995	1SS133
13, 601, 602, 603, 604, 701, 702, 703, 704 711, 710, 2001, 2002, 2003, 2004	241017995	1SS133
	FILTERS	
F101	2138305011	SFE 10.7 MA8-HA(RED)
※ F102, 103	2138305011	SFF 10.7 MA8-HA(RED)
▶ F102, 103	2138306011	SFE 10.7MS 3G-HA(RED)
F201	2138312011	SFU 450-B
F202	2138313011	BFU 450-C4N
F301	2138358011	CSB456F11
▶ F302	213852101	ANT1BODY
F303, 304	213851101	19KHz. MPX
▶ F0	213860901	BPMB6A 88-108MHz
	COILS	
T203	212710901	M7ZN-KS29511N
T204	212943501	AM. OSC
T205	212712401	AM. IFT
T201	212974701	FM. DET1
T202	212974801	FM. DET2
L201	101122221	RC875, 2.2MH, 5%
L701, 702	103447035	RC875, 47μH, 5%
	CERAMIC TRIMMERS	
TC201, 202	21211701	CVCNO6B200

REF. No	Part No.	Description
	RESISITORS	
RO, 3, 4, 700	111401025	1Ω, 1/4W, ±5%
R1003	111415025	15Ω, 1/4W, ±5%
R1	111468225	6.8KΩ, 1/4W, ±5%
R2	111533225	3.3Ω, 1/2W, ±5%
R401	111422125	220Ω, 1/4W, ±5%
R5, 6	111810025	10Ω, 1/8W, ±5%
R313, 412, 417	111810125	100Ω, 1/8W, ±5%
R202, 403, 405, 712, 730, 731	111810225	1KΩ, 1/8W, ±5%
▶ R120, 504, 720L	111810325	10KΩ, 1/8W, ±5%
R201, 205, 206, 411, 505, 601, 504, 548 602, 701, 717, 721L	111810325	10K, 1/8W, ±5%
▶ R218, 320, 321	111810425	100KΩ, 1/8W, ±5%
R213, 214, 905, 906, 911, 914, 916, 918	111810425	100KΩ, 1/8W, ±5%
※ R203	111812325	12KΩ, 1/8W, ±5%
R101	111812225	1.2KΩ, 1/8W, ±5%
R102, 109	111818125	180Ω, 1/8W, ±5%
R105, 110, 220, 408	111818225	1.8KΩ, 1/8W, ±5%
▶ R219	111818325	18KΩ, 1/8W, ±5%
R714	111818325	18KΩ, 1/8W, ±5%
R100	111822025	22Ω, 1/8W, ±5%
R409, 521, 523	111822125	220Ω, 1/8W, ±5%
R104, 606, 607	111822225	2.2KΩ, 1/8W, ±5%
▶ R314, 315	111815525	1.5MΩ, 1/8W, ±5%
R106, 407	111827125	270Ω, 1/8W, ±5%
▶ R203	111827325	27KΩ, 1/8W, ±5%
R322, 323	111827425	270KΩ, 1/8W, ±5%
R107, 113, 901, 902, 907, 909, 910	111833125	330Ω, 1/8W, ±5%
R208, 306, 307, 308, 311	111833225	3.3KΩ, 1/8W, ±5%
R503	111833325	33KΩ, 1/8W, ±5%
R103	111839552	3.9KΩ, 1/8W, ±5%
R514, 515, 600	111847025	47Ω, 1/8W, ±5%
R410, 1001, 1002	111847125	470Ω, 1/8W, ±5%
▶ R211, 215	111847225	4.7KΩ, 1/8W, ±5%
R112, 402, 604, 605, 708, 709, 710	111847225	4.7KΩ, 1/8W, ±5%
R324, 702, 703, 704, 705, 706, 707, 715, 716	111847325	47KΩ, 1/8W, ±5%
※ R720H	111847325	47KΩ, 1/8W, ±5%
R603	111847425	470KΩ, 1/8W, ±5%
R608, 609	111847525	4.7MΩ, 1/8W, ±5%
R404, 406	111856925	5.6Ω, 1/8W, ±5%
▶ R216	111856025	56Ω, 1/8W, ±5%
R204, 114	111856025	56Ω, 1/8W, ±5%
R111	111856125	560Ω, 1/8W, ±5%
▶ R310, 549, 550, 740, 741	111856225	5.6KΩ, 1/8W, ±5%
R207	111868025	68Ω, 1/8W, ±5%
※ R314, 315	111868425	680KΩ, 1/8W, ±5%
R501, 502	111875125	750Ω, 1/8W, ±5%
R520, 522	111875325	75KΩ, 1/8W, ±5%
R903, 904, 912, 913	111815125	150Ω, 1/8W, ±5%
R211	111856325	56KΩ, 1/8W, ±5%
R210, 915, 917	111827225	2.7KΩ, 1/8W, ±5%
▶ R121	111868225	6.8KΩ, 1/8W, ±5%
※ R320, 321	111812425	120KΩ, 1/8W±5%
※ R3001, 3002	111522525	2.2M Ω, 1/2W±5%
	SEMI FIXED RESISTORS	
VR201, 202	251247301	47KΩ, 6MM(RH0615C)
VR301	251222401	220KΩ, 6MM(RH0615C)
	CAPACITORS	
C601, 602, 603	141610865	0.1μF, ±20%, 50V ELEC
C203, 208, 210, 214, 313, 314, 702, 703	141601065	1μF, ±20%, 50V ELEC
C302, 309, 310, 321, 505, 506 515, 516, 604	141310065	10μF, ±20%, 16V ELEC
▶ C220, 226, 301	141310165	100μF, ±20%, 16V ELEC
C228, 318, 405, 513, 517, 600	141310165	100μF, ±20%, 16V ELEC
C11, 401, 501, 503	141210165	100μF, ±20%, 10V ELEC
C7	141510165	100μF, ±20%, 35V ELEC
C4, 5	141610165	100μF, ±20%, 50V ELEC
C315	141622865	0.22μF, ±20%, 50V ELEC
C8, 9	141322165	220μF, ±20%, 16V ELEC
C207	141622965	2.2μF, ±20%, 50V ELEC
C10	141333165	330μF, ±20%, 16V ELEC
C407, 408	141647865	0.47μF, ±20%, 50V ELEC
C305	141647965	4.7μF, ±20%, 50V ELEC

REF. No	Part No.	Description	
C13, 100, 211, 219, 1001, 2002	141347065	47μF, ±20%, 16V	ELEC
C2001	141247165	470μF, ±20%, 10V	ELEC
C312	141668865	0.68μF, ±20%, 50V	ELEC
⚠ C1, 2	141522267	2200μF, ±20%, 35V	ELEC
▶ C901, 902, 905, 906, 912, 913	1599121451	120 PF, ±5%, 50V	MICA
※ 901, 902, 905, 906 912, 913	188612145	120PF +80% −20% 50V	CER
C3, 102, 204, 205, 409, 1002	175610395	0.01μF, +80%. -20%, 50V	CER
C907, 1003	175610495	0.1μF, +80%. -20%, 50V	CER
C908, 909, 910, 911	188612145	120 PF, ±5%, 50V	CER
C227	188615145	150 PF, ±5%, 50V	CER
C410, 411	180618045	18 PF, ±5%, 50V	CER(CH)
▶ C219	175622395	0.022μF, +80%. -20%, 50V	CER
C101, 104, 201, 202, 206, 209, 212, 213, 218 224, 225, 319, 402, 406, 502, 504, 514, 518, 707	175622395	0.022μF, +80%. -20%, 50V	CER
C304, 903, 904	188633145	330 PF, ±5%, 50V	CER
C303, 700, 420	175647395	0.047μF, +80%. -20%, 50V	CER
※ 3001, 3002	175647395	0.047μF +80% −20% +50V	CER
※ C307, 308	188668145	680 PF, ±5%, 50V	CER
▶ C307, 308	1886471	470 PF, ±5%, 50V	CER
C704	171668255	0.0068μF, ±10%, 50V	CER
⚠ ▶ C12	1998104011	0.01μF 250V	CER
⚠ ※C12	199810107	0.01μF 250V	CER
C412 (M)	150647345	0.047μF, 5%, 50V	MYL
C234(S)	153643141	430 PF, ±5%, 50V	PPP
C701	1991134011	DB-5R5D104	
	MISCELLANEOUS		
X401	213810201	7.2 MHz	
X701	2138184011	CST 8.0 MTW	
▶ FRONT END	212511801	FTH-560H	
※ FRONT END	212512001	FTH3-502HA	
SW1	220237301	SPWN19	
CABLE CARD	216831701	30P, 150M	
WA1	216830701	30P, VERTICAL TYPE	
WA8	2138382011	2MM, 5P	
WA7	216838401	2MM, 9P	
WA9, 10	216847901	BMW250-05, 5P	
WA2	216848001	YMWO25-02, 2P	
WA6	216848201	YMWO25-03, 6P	
WA3	216845901	YW396-03AV, 2P	
WA4	216848101	YMW025-03 3P	
CABLE HOLDER	216300501	6P	
CN1	215857901	W-D0604#01	
RCA JACK *3	215561801	4P	
ANT	215574201	75 OHM, PAL +AM	
※ ANT	215577801	4P BLACK	
HEATSINK *2	371070203	40MM	
⚠ ▶ REL	2140131011	VS-12MBU-5, 12V, 10A	
⚠ ※ REL	2140225021	JW1AFSN-DC12V	
IC SOCKET	215519401	WSD1F-64T(1.78MM) IC SOCKET	
⚠ FUSE HOLDER *2	299911401	PBSP-H 0.3T	
⚠ ▶ TRANS2	213147601	AC 230V 50Hz	
⚠ ※ TRANS2	213136901	AC 120V 60Hz	
EARTH WIRE	289960101	1P 100MM	
TERMINAL WRAPPING *6	215537701	NKC-007-B	
※ EARTH WIRE	289961501	IP 40MM	

PCB-2 MOTOR CONTROL P.C. BOARD

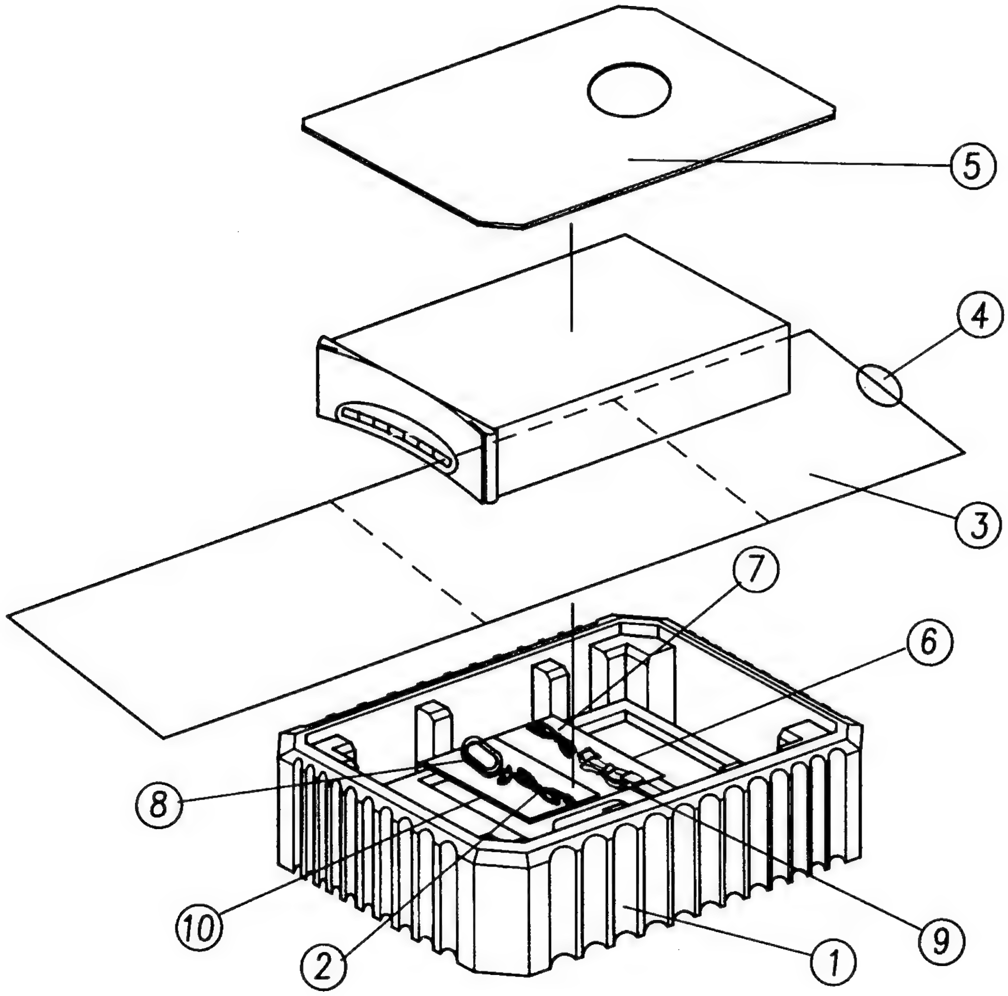
REF. No	Part No.	Description	
	TRANSISTORS		
Q503, 504	240211134	KTC3198	
Q2003, 2004	240215425	2 SC 2878-B	
	RESISTORS		
R2001, 2002	111810325	10 KΩ, 1/8 W, ±5%	
R532, 534	111839125	390 Ω, 1/8 W, ±5%	
R541, 542	111847025	47 Ω, 1/8 W, ±5%	
R915, 917	111827225	2.7 KΩ, 1/8 W, ±5%	
R533, 536	111410225	1KΩ, 1/4 W, ±5%	
R528, 529	111810225	1 KΩ, 1/8 W, ±5%	
R531, 537	111815425	150 KΩ, 1/8 W, ±5%	
R530, 535	111891325	91 KΩ, 1/8 W, ±5%	
	CAPACITORS		
C519, 520	141310065	10μF, ±20%, 16V	ELEC
C541, 544	141310165	100μF, ±20%, 16V	ELEC
C1003	175610495	0.1μF, +80%, -20%, 50	CER
C542, 543	175622395	0.022μF, +80%, -20%, 50	CER
C530, 531	141668965	6.8μF±20%, 50V	ELEC

MISCELLANEOUS

M1	2501384011	EUW MOF F25, A54
WA8-A	2168389011	2MM, 5P
WA7-A	2168391011	2MM, 9P

REF. No	Part No.	Description	
	PCB-3 BUFFER AMP P.C. BOARD		
	RESISTORS		
R621, 622	111822125	220Ω, 1/8 W, ±5%	
R623, 625	111847225	4.7KΩ, 1/8 W, ±5%	
R624, 626	111875325	75KΩ, 1/8 W, ±5%	
	CAPACITORS		
C623, 624, 626, 627	141310065	10 μF, ±20%. 16V	ELEC
C621, 622	141347065	47 μF, ±20%, 16V	ELEC
C625, 628	188633045	33 PF, 50% 50V	CER
	INTERGRATED CIRCUITS		
IC601	244123671	KA4558C	
	MISCELLANEOUS		
WA9-A, WA10-A	216847801	BMH250-05R, 5P	
	PCB-4 CONTROL P.C. BOARD		
	INTERGRATED CIRCUITS		
IC801	24404F14011	MSC1937-01	
	TRANSISTORS		
Q801, 802, 803	240610815	KSR1001	
	DIODES		
D810, 811, 812, 813, 814, 815, 816, 817 818, 819	241017995	1SS133	
	RESISTORS		
R807, 841	111810125	100Ω, 1/8 W, ±5%	
R804	111810325	10KΩ, 1/8 W, ±5%	
R806	111812325	12KΩ, 1/8 W, ±5%	
R801	111818025	18Ω 1/8 W, ±5%	
R802, 803	111822325	22KΩ 1/8 W, ±5%	
R805	111833125	330Ω 1/8 W, ±5%	
R808, 811, 812, 813, 814, 815, 816, 817 818, 819, 820, 821, 823, 824, 825 826, 827, 828, 828, 830, 831, 832, 833 834, 835, 836, 837, 838, 839, 840	111847325	47KΩ, 1/8 W, ±5%	
	CAPACITORS		
C804	141347065	CEA 47μF, ±20%, 16V	ELEC
C802, 803	141447065	CEA 47μF, ±20%, 25V	ELEC
	MISCELLANCEOUS		
S801, 802, 803, 804, 805, 806, 807, 808	22089901	177-620-002	
FLT	214325501	24-MT-01GK	
WA1-A	216828901	30P, ANGLE TYPE	
REMOTE	212581601	KRM-91M(38KHz)	
FLT HOLDER	322180401	ABS	
LD812	241918335	R54MC F07	
CABLE HOLDER	216300301	4P	
EARTH WIRE	289960101	1P 100MM	
	PCB-5 RIBBON P.C. BOARD		
WA5	216846901	13P BLACK	
WA6	216848201	YMW 025-06 6P	
CABLE HOLDER	216300501	6P	
FUSE ✱2	2998225011	TIA/250V	
	MISCELLANCEOUS		
⚠ ▶ TRANS1	213149001	AC230V 50HZ	
⚠ ✱ TRANS1	213149101	AC120V60HZ	

Tuner

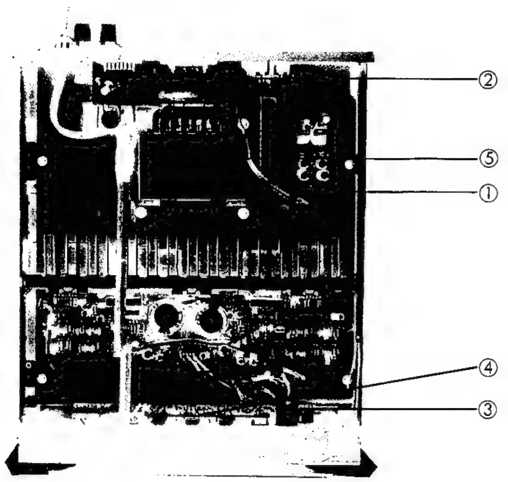


NO	PARTS NAME	PARTS NO.	Q'TY
1	PAD BOTTOM	3-127-916-01	1
2	PIN CORD	2-212-141-01	2
3	SHEET POLY	3-324-029-01	1
4	STICKER SET	3-819-817-01	1
5	INNER LID	3-324-019-01	1
6	BAG POLY	3-219-009-01	1
7	ANT FM	2-213-103-01	1
8	LOOP ANTENNA AM	2-213-353-02	1
9	CONNECTOR ASS'Y	2-159-978-02	1
10	MANUAL SHEET	3-221-823-01	1

2 HK-A300

INTERNAL VIEW

■ TOP VIEW



① PCB-1 Main p.c.board
② PCB-2 Power Transformer p.c.board
③ PCB-3 Control p.c.board
④ PCB-4 Control p.c.board
⑤ Power Transformer.

DISASSEMBLY PROCEDURES

1 TOP Cover Removal

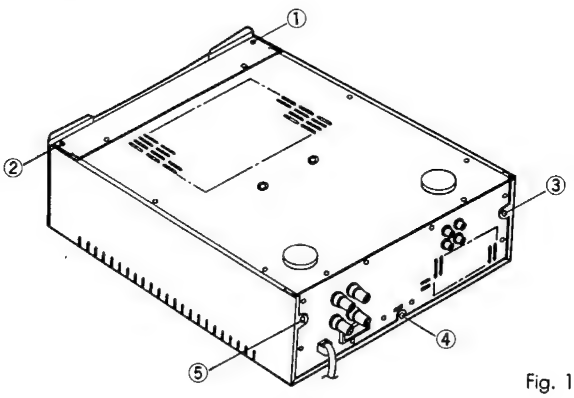


Fig. 1

1. Remove screws ① to ⑤ in Fig. 1
2. Remove the top cover

2 Bottom Cover Removal

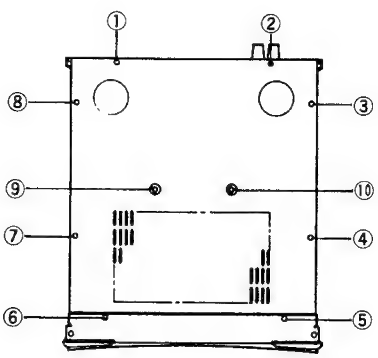


Fig. 2

1. Remove screws ① to ⑪, and then remove the bottom cover in Fig. 2

3 Rear Panel Removal

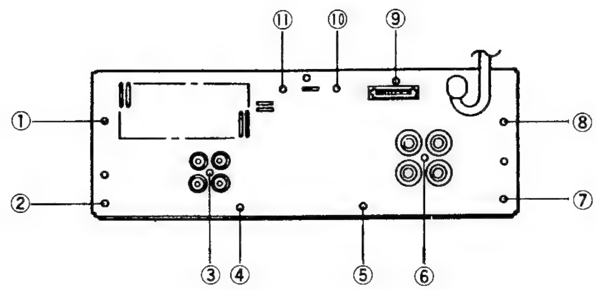


Fig. 3

1. Remove screws ① to ⑪, and then remove the rear panel in Fig.3

4 1 PCB-⑦ (Power Trans Former PCB) Removal

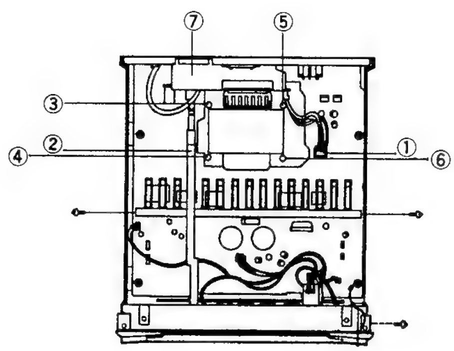
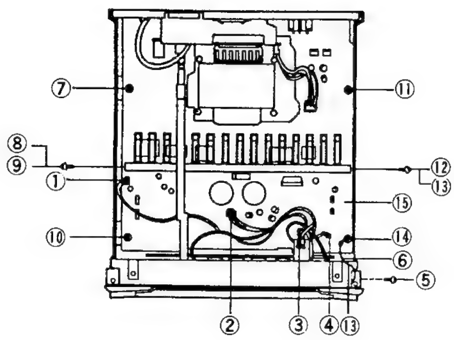


Fig. 4

1. Remove the rear panel in Fig. 3 (Refer to step 3)
2. Remove connector ①, Remove Switch rod ② from speaker selector switch
3. Remove screws ③ to ⑥, and then remove the pcb-2 ⑦ with the power trans

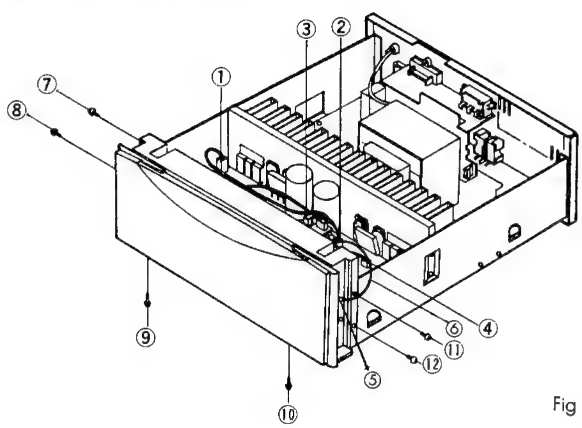
5 PCB-⑮(Main PCB) Removal



Fig・5

1. Remove the pcb-2(Refer to step 4)
2. Remove connectors ① to ④ in Fig. 5
3. Remove screws ⑤, and then untie the ground wire ⑥ in Fig. 5
4. Remove screws ⑦ to ⑭, and then remove the main pcb – ⑮

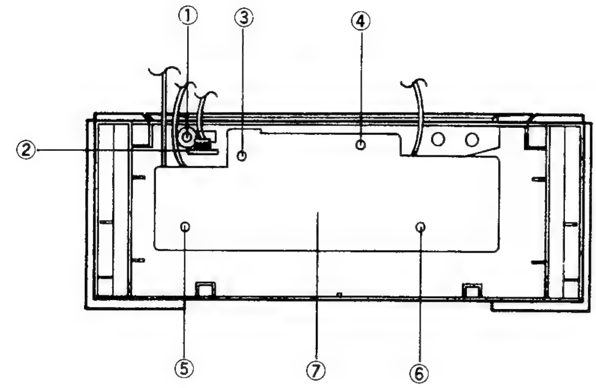
6 Front Panel Assembly Removal



Fig・6

1. Remove connectors ① to ④ in Fig・6
2. Remove screws ⑤, and then untie the ground wire ⑥ in Fig. 6
3. Remove screws ⑦ to ⑫, and then remove the front panel assembly by pulling it toward you gently.

7 PCB-②,⑦(Control PCB) Removal.



Fig・7

1. Remove the front panel assembly from the unit in Fig・6 (Refer to step 6)
2. Remove serews①, and then remove the pcb-3 ② in Fig. 6
3. Remove screws ③ to ⑥, and then remove the pcb-4 ⑦ in Fig. 6

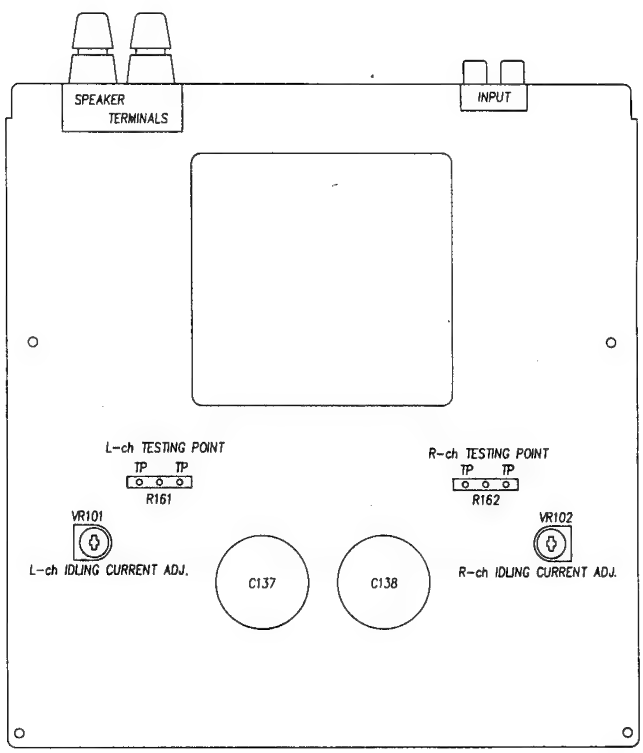
Amplifier : A-300

Conditions:
- Set the Volume control of Tuner to minimum.
- Set the Speaker switches to "off" position.
- Make the adjustment at a room temperature of 77° F (25°C).
- After the Power Switch of Tuner is pushed on, Wait for 60 minutes before measuring to be sure of the most stable operation.

⚠ NOTE :
- Power amplifier can be serviced without TUNER by shorting Points PIN No. AC1 and JUMPER WIRE No. J93 AC2
- DC OFFSET VOLTAGE should be less then 100mV after POWER ON 12sec.

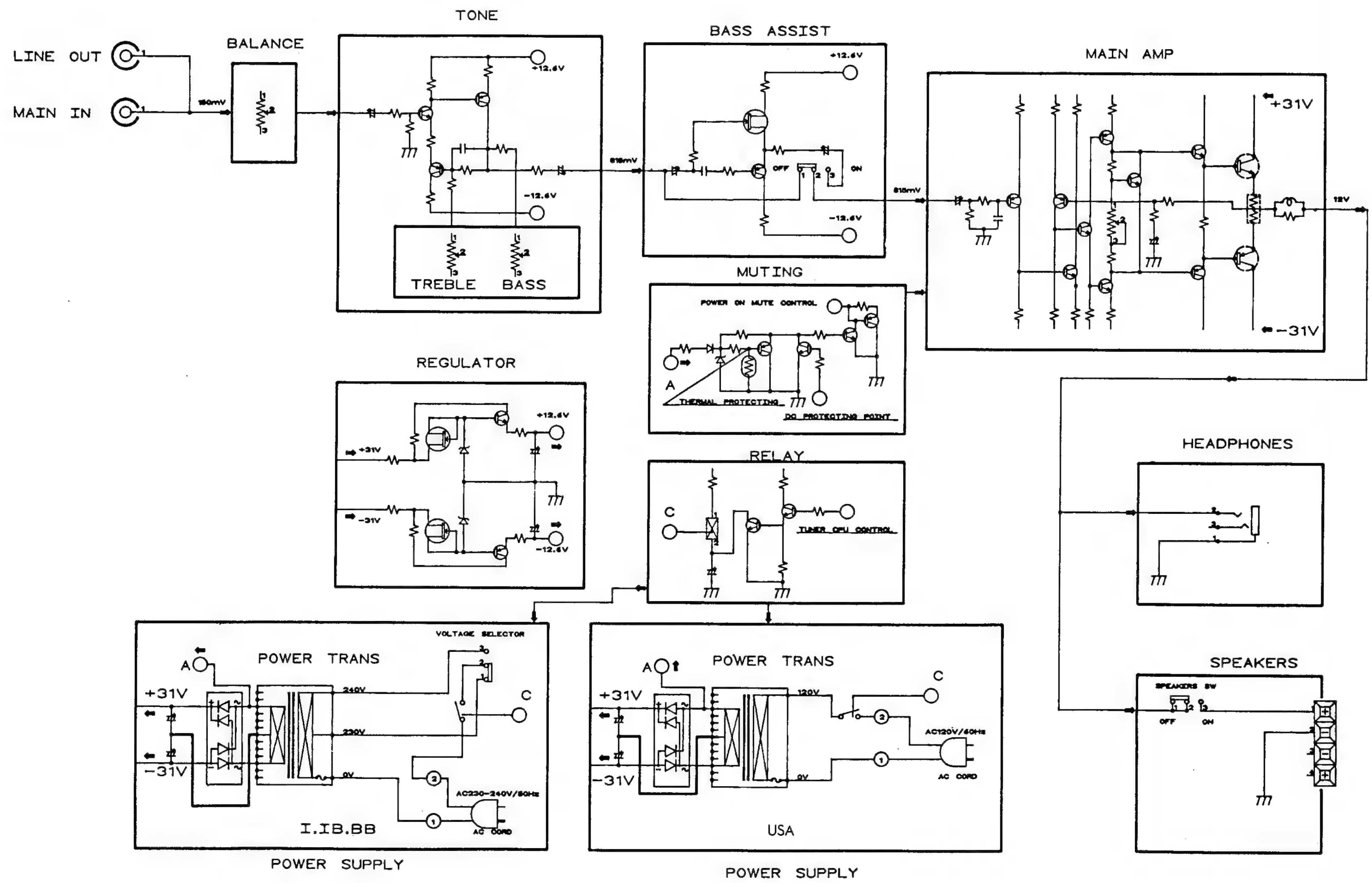
■ IDLING CURRENT ADJUSTMENT

STEP	Connection Equipments	Adjustment	FOR
1	Connect the Digital Volt Meter to both side of R161	VR101(L-Ch)	26mV±2mV
2	Connect the Digital Volt Meter to both side of R162	VR102(R-ch)	26mV±2mV



A300 Adjustment point

A-300 AMPLIFIER BLOCK DIAGRAM



CIRCUIT DESCRIPTION

Amplifier : A300

■ TONE CONTROLS.

Fig 1 shows the basic tone control circuit. The tone amplifier is a DC-coupled amplifier

The tone circuit consistitutes INPUT small signal Transistor (Q201) OUTPUT small signal Transistor (Q205) and CONSTANT current Transistor (Q203). Tone control (Bass, Treble) is accomplished by providing the tone amplifier NFB circuit with a frequency selective characteristic. (Bass:50Hz, Treble:10kHz)

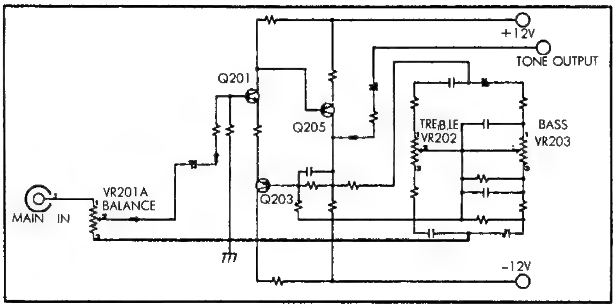


Fig. 1

■ BASS ASSIST

Fig 2 shows the BASS ASSIST circuit.

The BASS ASSIST circuit consists of CONSTANT current F. E. T (Q207) and small signal transistors (Q209, Q211).

This curcuit is active low cut filter. (Accent frequency is 55Hz).

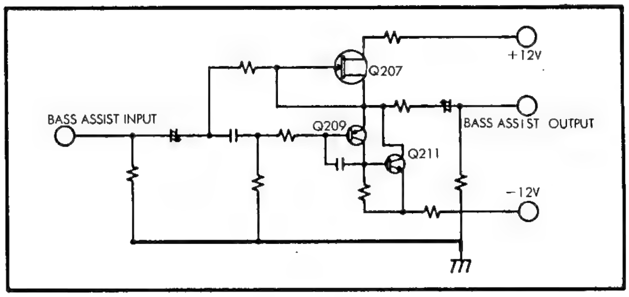


Fig. 2

■ POWER AMPLIFIER SECTION

The basic circuit arrangement of the power amplifier is shown in Fig 3. The first stage is a differential amplifier comprising PNP two transistors (Q103, 107).

The pre-drive stage consists of ultra low capacitance transistors (Q113, Q115).

The power stage bias voltage is supplied by the transistor (Q117).

The power stage consists of drive transistors (Q119, Q121) and power transistors (Q125, Q127).

The power amplifer has a over-output current protection circuit. If current exceeding the specification flows through Q125 & Q127(L-ch), Q123 & Q135 Will conduct. As result Q133 will switch OFF, and the mute line will go low(MUTE). The thermal protection circuit consists of Transistors (Q134, Q138) and posistor PO 101. When heat sink temperature exceeds 95℃, Q136 & Q134 switch ON and the MUTE line goes low(MUTE).

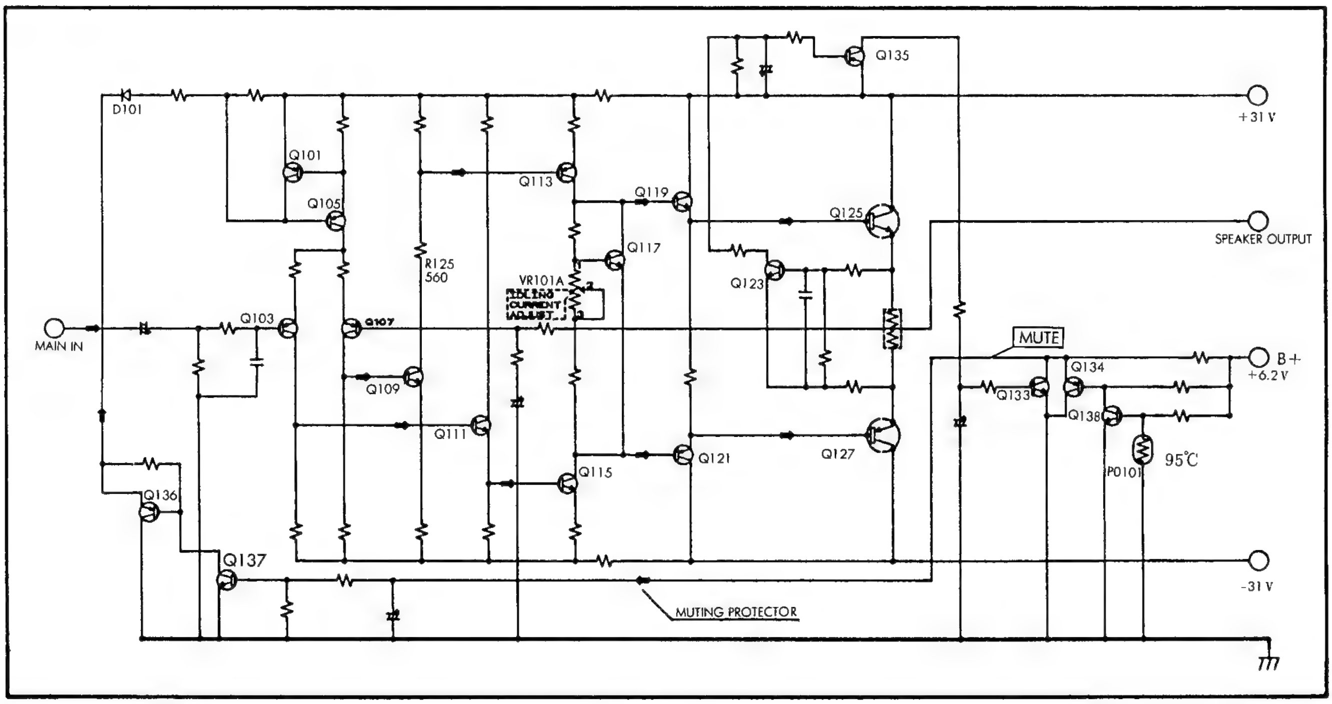
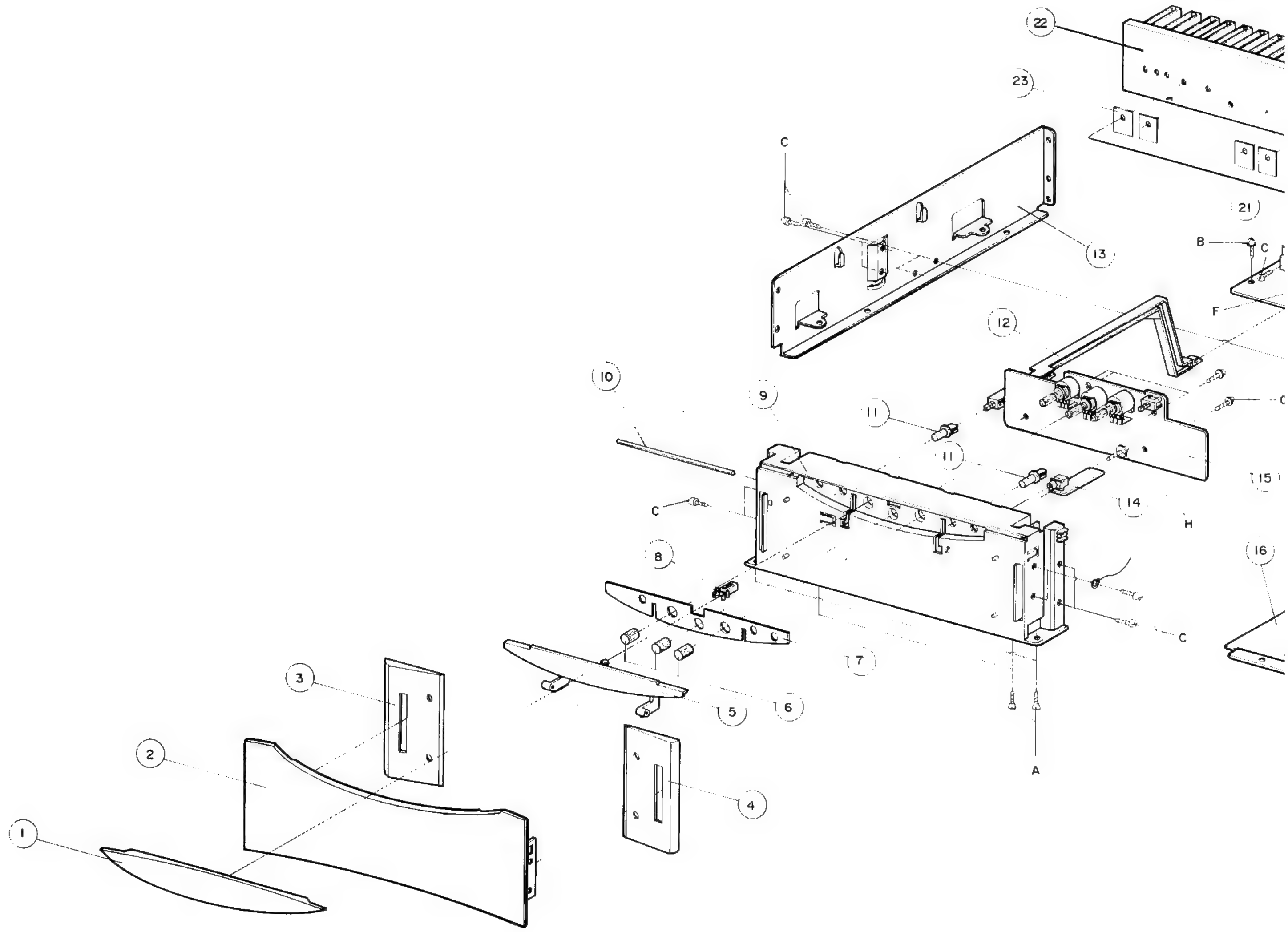
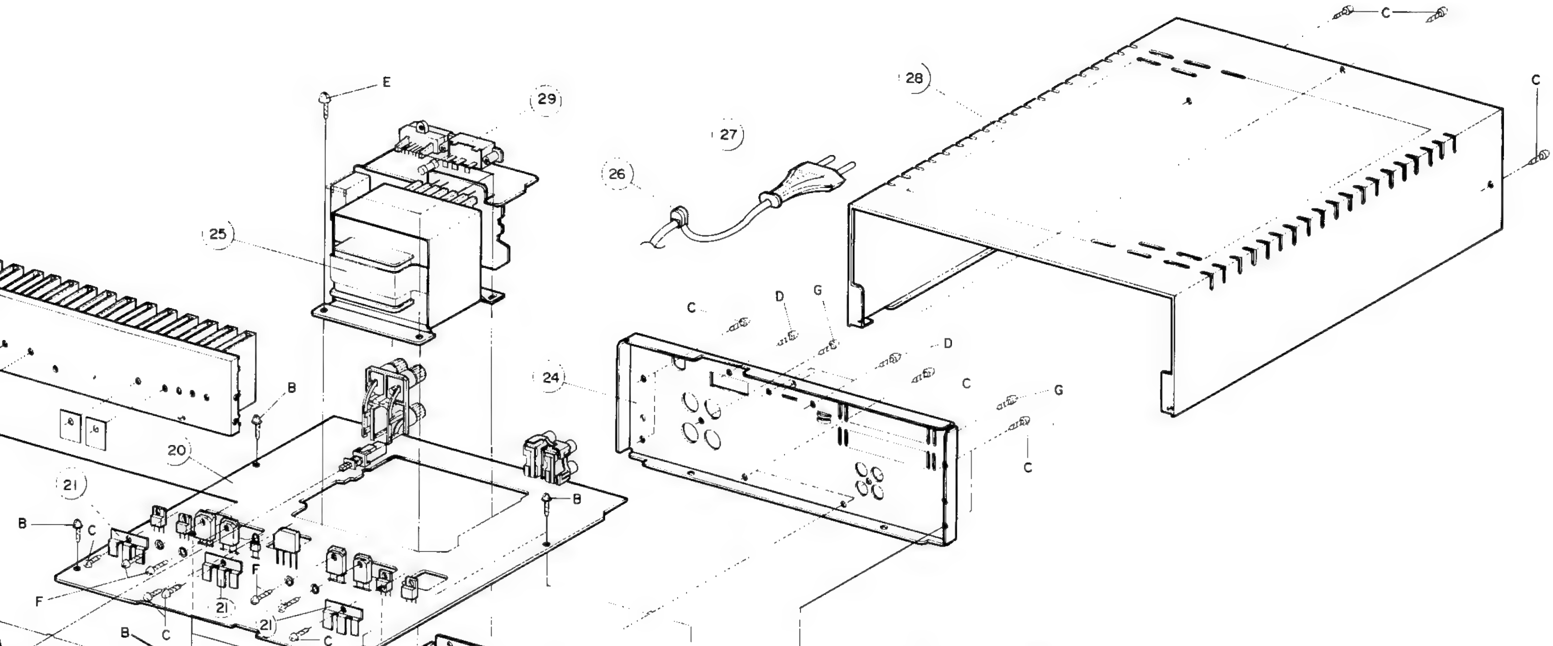


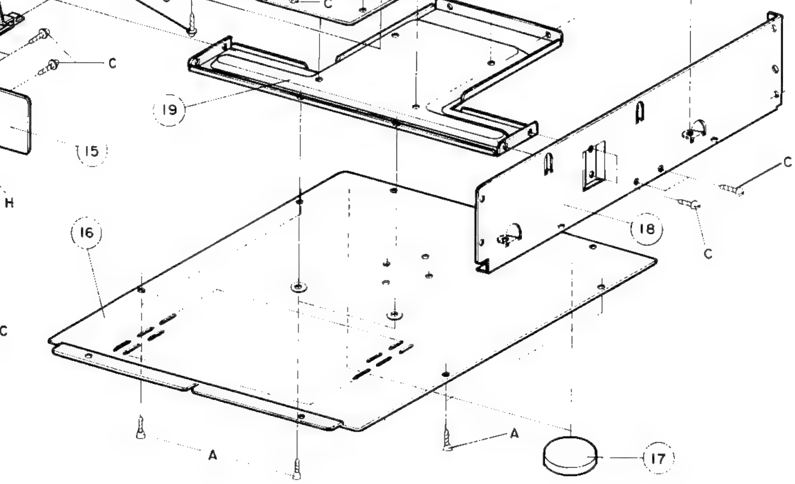
Fig. 3

EXPLODED VIEW

Amplifier : A300







NOTE: A=(USA), B=(U,IB,BB)

NO	PARTS NAME	PARTS NO	MATERIAL	Q'TY	REMARK
1	PANEL DOOR	3-127-903-01	PMMA SMOG	1	A,B
2	PANEL FRONT	3-127-801-01	AL A6063-T5	1	A,B
3	FOOT L	3-127-906-01	AL A6063-T5	1	A,B
4	FOOT R	3-127-907-01	AL A6063-T5	1	A,B
5	HOLDER DOOR	3-127-919-01	ABS 720 BLACK	1	A,B
6	KNOB ROTARY	3-127-812-01	ABS720	3	A,B
7	SHEET PANEL	3-127-803-01	PVC T0.5	1	A,B
8	DOOR LOCK	5-110-133-01		1	A,B
9	PANEL BASE	3-127-902-01	ABS 720	1	A,B
10	SHAFT	3-127-921-01	SUM-24L	1	A,B
11	KNOB PUSH	3-127-802-01	ABS 720	2	A,B
12	KNOB JOINT	3-127-905-01	ABS BLACK	1	A,B
13	FRAME SIDE L	3-324-805-01	SECC T1.0	1	A,B
14	PCB PHONES JACK	2-170-861-31		1	A,B
15	PCB CONTROL	2-170-861-11		1	A,B
16	COVER BOTTOM	3-127-808-03	SECC T0.8	1	A,B
17	FOOT CUSHION	3-127-924-01	SBR BLACK	2	A,B
18	FRAME SIDE R	3-127-806-01	SECC T1.0	1	A,B
19	FRAME TRANS	3-127-809-01	SECC T1.0	1	A,B
20	PCB ASS'Y MAIN	A-170-861-03	MAIN W:247, D:330	1	B
20	PCB ASS'Y MAIN	A-17A-861-01	MAIN W:247, D:330	1	A
21	BRK'T TR	3-127-811-01	PB T0.6	3	A,B
22	HEAT SINK	3-127-810-01	AL A6063-T5	1	A,B
23	MICA SHEET	3-120-630-01	18.5 x 22	4	A,B
24	PANEL REAR	3-127-804-01	SECC T0.8	1	B
24	PANEL REAR	3-128-601-01	SECC T0.8	1	A
25	POWER TRANS	2-131-489-01	AC 230V 2.7A	1	B
25	POWER TRANS	2-131-494-01	AC 120V/60HZ 2.7A	1	A
26	BUSHING R/STRAIN	8-201-117-01	HEYCO SR-14-1	1	B
26	BUSHING R/STRAIN	8-201-118-01	HEYCO SR-15-1	1	A
27	CORD AC	2-211-109-02	NDG-009 VDE	1	B
27	CORD POWER	2-211-124-02	NDG-023-0	1	A
28	TOP COVER	3-127-807-01	SECC T0.8 SPRAY	1	A,B
29	FUSE	2-188-619-01	5.2 x 20 250V 1.25A	1	B
29	FUSE	2-188-640-01	5.2 x 20 250V 2.5A	1	A
A	SCREW	7-464-408-01	CBZ30P080FZK	10	A,B
B	SCREW	7-344-408-01	ATZ30P080FZK	6	A,B
C	SCREW	7-764-408-01	VBZ30P080FZK	46	A,B
D	SCREW	7-764-410-01	VBZ30P100FZK	3	A,B
E	SCREW	7-768-408-01	VBZ40P080FZK	4	A,B
F	SCREW	7-999-164-01	VBZ30P120FZK+SPRING	4	A,B
G	SCREW	7-999-166-01	PTB30P100FZK	2	A,B
H	SCREW	7-999-163-01	S30C	1	A,B

ELECTRICAL PARTS LIST

A

Amplifier A300

Ref. No	Part No.	Description
	CHASSIS MISCELLANEOUS	
⚠ P1	221110902	AC LINE CORD (I, IB, BB)
	221112402	AC LINE CORD (USA)
⚠ T1	213148901	POWER TRANSFORMER (I, IB, BB)
	213149401	POWER TRANSFORMER (USA)
⚠ FU301	218861901	FUSE T1.25A/250V (I, IB, BB)
	218864001	FUSE F2.5A/250V (USA)
	PCB-1 MAIN (P.C. BOARD)	
	RESISTOR	
⚠ R161, 162	139021401	0.22Ω, 5W+5W
⚠ R165, 166	114110023	10Ω, 1W, ±5%
⚠ R185, 186	114168123	680Ω, 1W±5%
⚠ R183, 184	130447925	4.7Ω, 1/4W, ±5% FUSE
⚠ R141, 142, 147, 148	130447025	47Ω, 1/4W, ±5% FUSE
⚠ R177, 178	130433125	330Ω, 1/4W, ±5% FUSE
⚠ R163, 164	130410025	10Ω, 1/4W, ±5% FUSE
R167, 174	111410425	100KΩ, 1/4W, ±5%
R109, 110	111410325	10KΩ, 1/4W, ±5%
R159, 160	111410225	1KΩ, 1/4W, ±5%
R113, 114, 115, 116, 135, 136	111415225	1,5KΩ, 1/4W, ±5%
R143, 144, 145, 146	111422325	22KΩ, 1/4W, ±5%
R169	111422225	2.2KΩ, 1/4W, ±5%
R101, 102	111822225	2.2KΩ, 1/8W, ±5%
R179, 180	111422025	22 Ω, 1/4W, ±5%
R131, 132	111427225	2.7KΩ, 1/4W, ±5%
R119, 120	111427125	270 Ω, 1/4W, ±5%
R103, 104, 107, 108, 170	111433325	33KΩ, 1/4W, ±5%
R176, 187	111433225	3.3KΩ, 1/4W, ±5%
R105, 106, 155, 156	111433125	330 Ω, 1/4W, ±5%
R149, 150	111436325	36KΩ, 1/4W, ±5%
R177	111439225	3.9KΩ, 1/4W, ±5%
R153, 154, 172, 173, 175	111447225	4.7KΩ, 1/4W, ±5%
R111, 112, 117, 118, 178	111447125	470 Ω, 1/4W, ±5%
R121, 122, 123, 124, 125, 126, 127, 128, 129, 130	111456125	560 Ω, 1/4W, ±5%
R133, 134, 139, 140	111456025	56 Ω, 1/4W, ±5%
R168, 171	111468325	68KΩ, 1/4W, ±5%
R158	111482125	820 Ω, 1/4W, ±5%
R151, 152	111482025	82 Ω, 1/4W, ±5%
R157	111491125	910 Ω, 1/4W, ±5%
R137, 138	111439125	390 Ω, 1/4W, ±5%
	CONTROLS	
VR101, 102	251247101	470Ω
	CAPACITOR	
C129, 142	141601065	1μF, ±20%, 50V, ELEC
C115, 116	141310065	10μF, ±20%, 16V, ELEC
C140, 141	141610065	10μF, ±20%, 50V, ELEC
C130	141210165	100μF, ±20%, 10V, ELEC
C131, 132, 133, 134	141422165	220μF, ±20%, 25V, ELEC
C103, 104	141247065	47μF, ±20%, 10V, ELEC
C119, 120	141447965	4.7μF, ±20%, 25V, ELEC
C109, 110, 111, 112, 135, 136	141647065	47μF, ±20%, 50V, ELEC
C111, 112	141147165	470μF, ±20%, 6.3V, ELEC
⚠ C137, 138	199113101	6800μF, ±20%, 50V, ELEC
⚠ C139	1998104011	10000pF, ±5% 250V (I. IB. BB)
	199810107	10000PF. ±5% 250V (USA)
C117, 118	159910145	100PF. ±5% 100V (I. IB. BB)
	188610145	100PF. ±5% 50V (USA)
C143, 144, 145, 146, 149, 150	175610495	100000pF, ±80%,-20% 50V (I. IB. BB)
C127, 128, 101, 102, 147, 148	159915145	150PF. ±5%, 100V (I. IB. BB)
C113, 114	188605015	5pF, ±5%, 50V
C105, 106	159968045	680PF. ±5% 100V (I. IB. BB)
	188668045	680PF. ±5% 50V (USA)

REF. No	Part No.	Description
C123, 124, 125, 126	150610445	100000pF, 5% 50V
C121, 122	150668345	47000pf, 5% 50V
	TRANSISTORS	
⚠ Q125, 126	240310321	KTD718–0
⚠ Q127, 128	240110811	KTB688–0
Q115, 116	2402116411	2SC3787S
Q113, 114	2400117411	2SA1477S
Q119, 120	240217321	KTC4370Y
Q121, 122	240015121	KTA1659Y
⚠ Q130	240310621	KTD1351Y
⚠ Q129	240110321	KTB988Y
Q117, 118, 133, 138	240211135	KTC3198GR
Q101, 102, 105, 106, 134	240011835	KTC1266GR
Q109, 110, 111, 112, 123, 124, 137	240011825	KTC3200BL
Q103, 104, 106, 107, 135, 136	240011425	KTC1268BL
	F.E.T	
Q131, 132	2404118151	2SK373
	DIODES	
⚠ D107	2413091671	PBL403
⚠ D106	2413581651	1N403L
D101, 102	241017995	1SS133
⚠ D103, 104	242113035	ZENER, 1N964, 13V
⚠ D105	242106245	ZENER, 1N753, 6.2V
	COILS	
L101, 102	212930501	0.7μH
	MISCELLANEOUS	
P0101	2505121011	POSISTOR
S101	220237301	PUSH SWITCH
SPEAKER TERMINAL	215577701	
INPUT JACK	215561801	
WA104	216813401	WAFER 3P
WA103, 105	216812201	WAFER 3P
WA101, 102	216812301	WAFER 4P
LUG	289960701	EARTH WIRE

PCB–2 CONTROL P.C. BOARD

REF. No	Part No.	Description
	CONTROLS	
VR201	250122021	250KΩ, MN
VR202, 203	250121901	100KΩ, 20C
	RESISTORS	
R249, 250, 207, 208	111810425	100KΩ, 1/8W, ±5%
R251, 252	111810325	10KΩ, 1/8W, ±5%
R217, 218, 221, 222	111810225	1KΩ, 1/8W, ±5%
R219, 220, 239, 240	111810125	100 Ω, 1/8W, ±5%
R201, 202	111812225	1.2KΩ, 1/8W, ±5%
R215, 216, 207, 208	111815425	150KΩ, 1/8W, ±5%
R209, 210	111815325	15KΩ, 1/8W, ±5%
R237, 238	111822425	220KΩ, 1/8W, ±5%
R231, 232	111822225	2.2KΩ, 1/8W, ±5%
R229, 230	111822125	220 Ω, 1/8W, ±5%
R211, 212	111827125	2.7KΩ, 1/8W, ±5%
R223, 224	111827425	270KΩ, 1/8W, ±5%
R213, 214, 225, 226, 245, 248	111833125	330 Ω, 1/8W, ±5%
R203, 204	111839125	390 Ω, 1/8W, ±5%
R205, 206, 235, 236	111847325	47KΩ, 1/8W, ±5%
R243, 244, 246, 247	111847925	4.7 Ω, 1/8W, ±5%
R241, 242	111856225	5.6KΩ, 1/8W, ±5%
R227, 228	111882025	82 Ω, 1/8W, ±5%
R233, 234	111833025	33 Ω, 1/8W, ±5%

REF. No	Part No.	Description
	CAPACITORS	
C219, 220	141610865	0.1μF, ±20%, 50V ELEC
C205, 206	141622965	2.2μF, ±20%, 50V ELEC
C211, 212, 213, 214	141322065	22μF, ±20%, 16V ELEC
C223, 224	141647865	0.47μF, ±20%, 50V ELEC
C217, 218, 226, 227	141347065	47μF, ±20%, 16V ELEC
C210, 209	150615441	150000pF, ±5%, 50V
C207, 208	150627345	27000pF, ±5%, 50V
C201, 202	150636345	36000pF, ±5%, 50V
C221, 222	150647345	47000pF, ±5%, 50V
C203, 204	150668245	6800pF, ±5%, 50V
C215, 216	188633045	33pF, ±5%, 50V
C228, 229	188610045	10pF, ±5%, 50V
	TRANSISTORS	
Q201, Q202	240211135	KTC3198GR
Q203, 204, 205, 206	240011835	KTA1266GR
Q211, 212	240211825	KTC3200BL
Q209, 210	240011425	KTC1268BL
	F.E.T	
Q207, 208	2404111351	2SK246GR
	MISCELLANEOUS	
S201	220219801	PUSH SWITCH
CW103	215988902	CONNECTOR ASS'Y 3P
CW101	215979001	CONNECTOR ASS'Y 4P
CW102	215989202	CONNECTOR ASS'Y 4

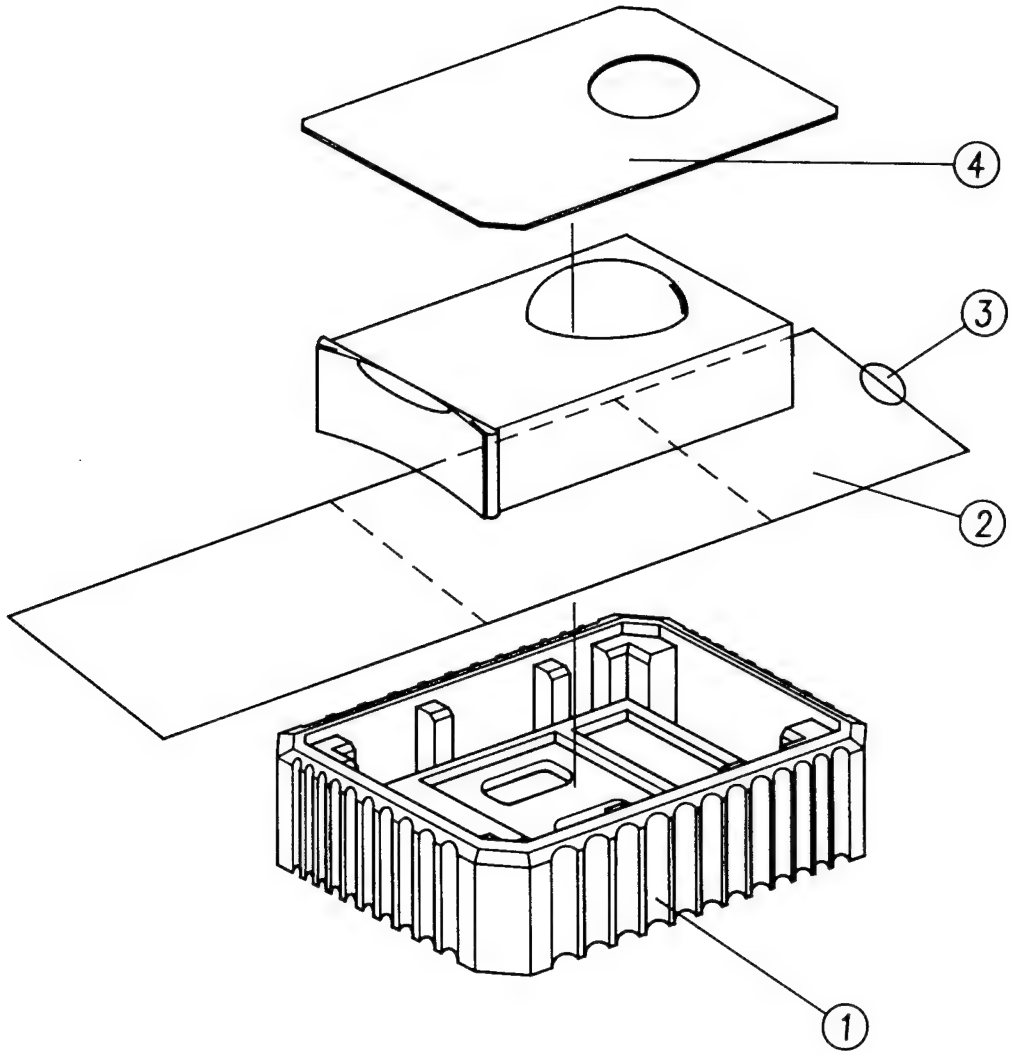
PCB–3 POWER RELAY P.C. BOARD

REF. No	Part No.	Description
	RESISTOR	
R304	1114110023	10Ω, 1W
R303	111815225	1.5KΩ, 1/8W, ±5%
R301	111847225	4.7KΩ, 1/8W, ±5%
	CAPACITOR	
C301	141901065	1μF, 20%, 100V, ELEC
C302	199810401'1	10000pF, ±5%, 250V (I.IB.BB)
	199810107	10000pF, ±5%. 250V (USA)
	TRANSISTORS	
Q301, 302	240211135	KTC3198GR
	DIODE	
D301	241017995	1SS133
	RELAY	
⚠ RY301	214022502	JW1AFSN-DC12V
	MISCELLANEOUS	
⚠ S301	219017901	SLIDE SWITCH
CW104	215998201	CONNECTOR ASS'Y 3P

PCB–4 HEADPHONES P.C. BOARD

REF. No	Part No.	Description
PHONES JACK	215565001	3P MINI JACK
CW105	215964301	CONNECTOR ASS'Y 3P

Amplifier : A-300

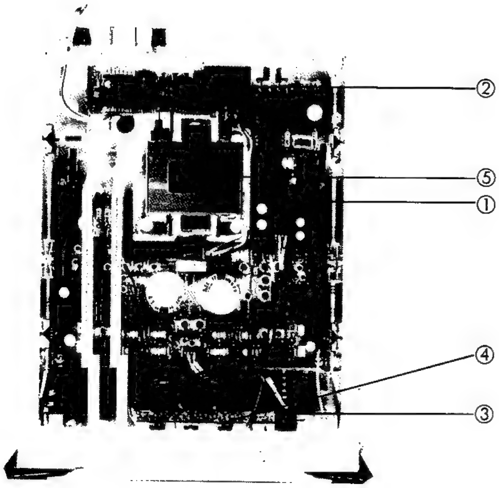


NO	PARTS NAME	PARTS NO.	Q'TY
1	PAD BOTTOM	3-127-916-01	1
2	SHEET POLY	3-324-029-01	1
3	STICKER SET	3-819-817-01	1
4	INNER LID	3-324-019-01	1

3 HK-A500

INTERNAL VIEW

■ TOP VIEW



① PCB-1 Main p.c.board
② PCB-2 power Transformer p.c.board
③ PCB-3 Control p.c.board
④ PCB-4 Control p.c.board
⑤ Power transformer

DISASSEMBLY PROCEDURES

1 TOP Cover Removal

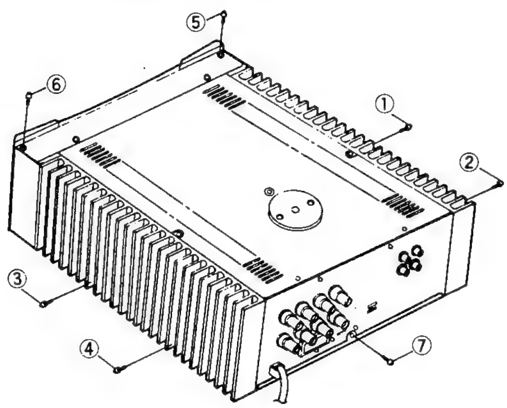


Fig. 1

1. Remove screws ① to ⑦ in Fig. 1
2. Remove the top cover

2 Bottom Cover Removal

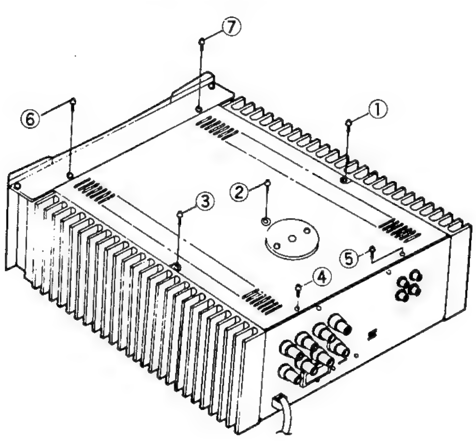


Fig. 2

1. Remove screws ① to ⑦ in Fig. 2, and then remove the bottom cover.

3 Rear Panel Removal

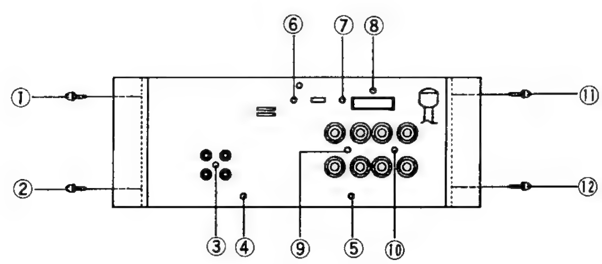


Fig. 3

1. Remove screws ① to ⑫ in Fig. 3, and then remove the rear panel

4 PCB-⑤ (Power Trans Former PCB)Removal

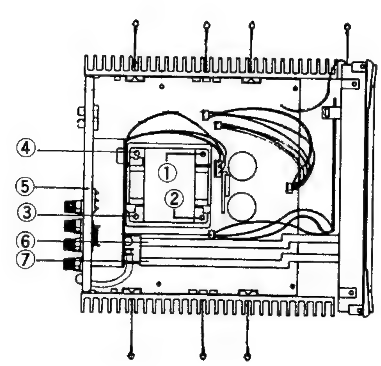


Fig. 4

1. Remove the rear panel in Fig.3 (Refer to step 3)
2. Remove screws ① to ④ in Fig. 4, and then remove the pcb-2 ⑤ with the power transformer
3. Remove switch rods ⑥ to ⑦ and speaker selector switch in Fig. 4

5 PCB-⑱(Main PCB)Removal

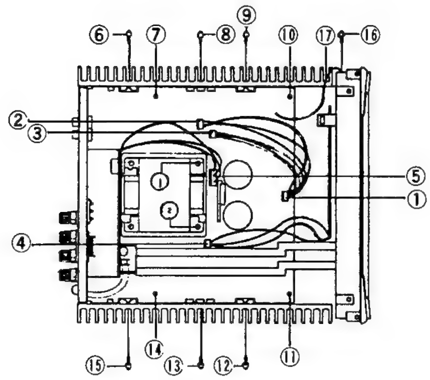


Fig · 5

1. Remove the pcb-2 and power trans (Refer to step 4).
2. Remove connectors ① to ⑤ in Fig · 5 , and then remove screws ⑥ to ⑮
3. Remove screw ⑯ in Fig · 5, and then untie the ground wire ⑰
4. Remove the pcb-⑱ Fig. 5

6 Front Panel Assembly Removal

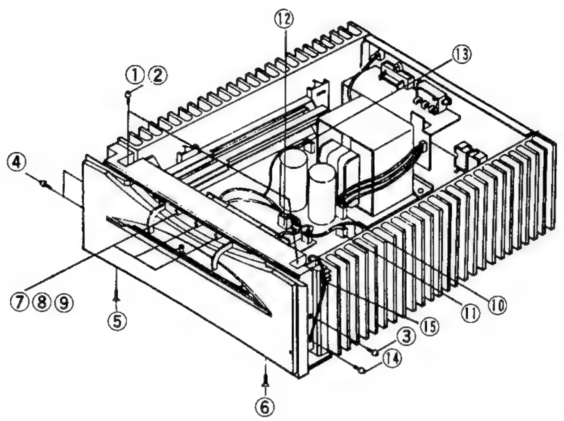


Fig. 6

1. Remove the rotary knobs ⑦ to ⑨ in Fig. 6
2. Remove connectors ⑩ to ⑬ in Fig. 6
3. Remove screw ⑭ and then unite the ground wire ⑮ in Fig · 6
4. Remove screws ① to ⑥ in Fig · 6, and then remove the front panel assembly by pulling it toward you gently.

7 PCB-②, ⑦(Control PCB)Removal.

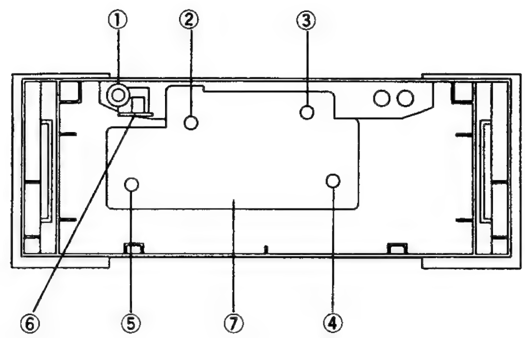


Fig · 7

1. Remove the front panel assembly (Refer to step 6)
2. Remove screw ①, in Fig · 7, and then remove pcb-3 ⑥
3. Remove screws ② to ⑤ , in Fig. 7, and then remove pcb-4 ⑦

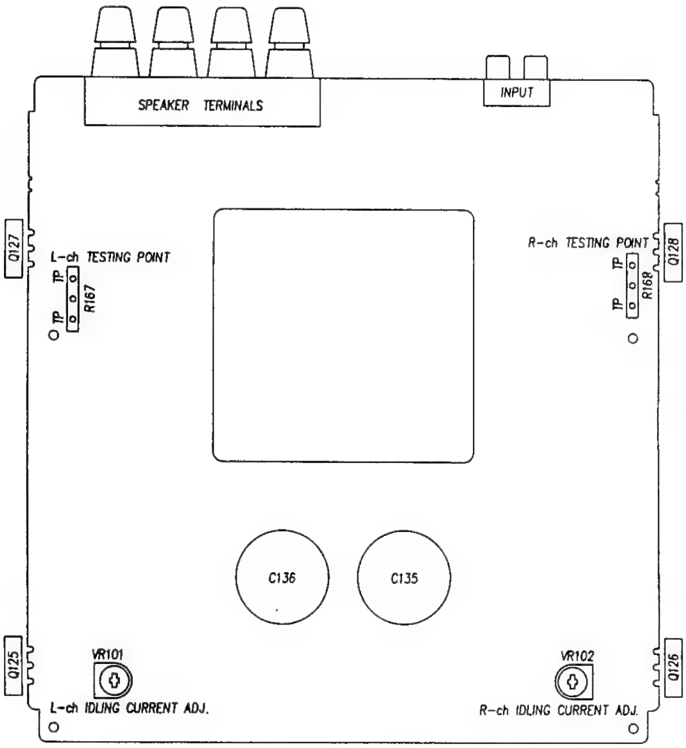
Amplifier : A500

Conditions:
- Set the Volume control of Tuner to minimum.
- Set the Speaker switches to "off" position.
- Make the adjustment at a room temperature of 77° F (25°C).
- After the Power Switch of Tuner is pushed on, Wait for 60 minutes before measuring to be sure of the most stable operation.

⚠ NOTE:
- Power amplifier can be serviced without TUNER by shorting Points PIN No. AC2 and JUMPER WIRE No. J93
- DC OFFSET VOLTAGE should be less then 100mV after POWER ON 12sec.

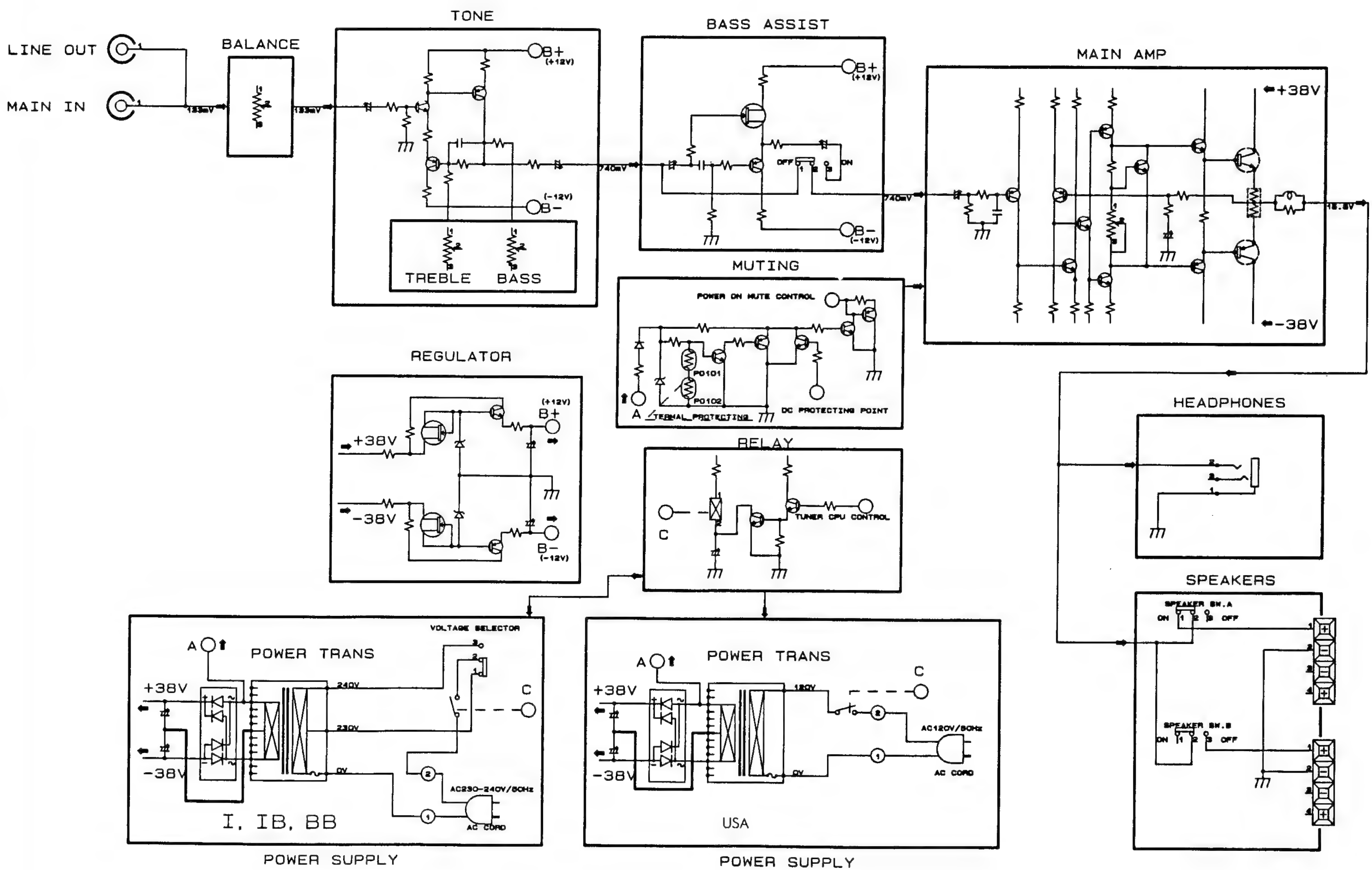
■ IDLING CURRENT ADJUSTMENT

STEP	Connection Equipments	Adjustment	FOR
1	Connect the Digital Volt Meter to both side of R167	VR101(L-ch)	26mV±2mV
2	Connect the Digital Volt Meter to both side of R168	VR102(R-ch)	26mV±2mV



A500 Adjustment point

A-500 AMPLIFIER BLOCK DIAGRAM



Amplifier : A-500

■ TONE CONTROLS.

Fig 1 shows the basic tone control circuit. The tone amplifier is a DC-coupled amplifier

The tone circuit consistitutes INPUT small signal Transistor (Q201) OUTPUT small signal Transistor (Q205) and CONSTANT current Transistor (Q203). Tone control (Bass, Treble) is accomplished by providing the tone amplifier NFB circuit with a frequency selective characteristic. (Bass:50Hz, Treble:10kHz)

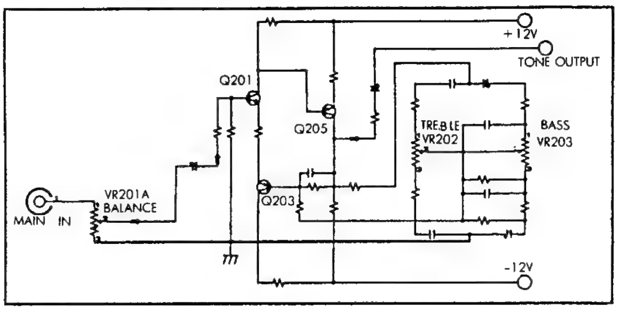


Fig. 1

■ BASS ASSIST

Fig 2 shows the BASS ASSIST circuit.

The BASS ASSIST circuit consists of CONSTANT current F. E. T (Q207) and small signal transistors (Q209, Q211).

This curcuit is active low cut filter. (Accent frequency is 55Hz).

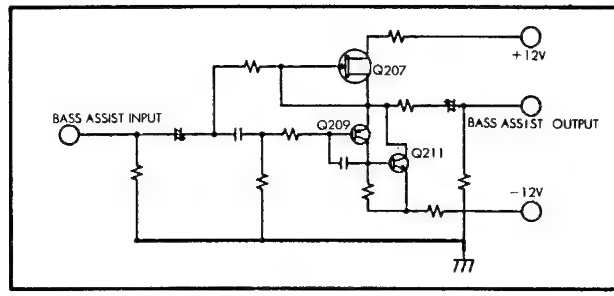


Fig. 2

■ POWER AMPLIFIER SECTION

The basic circuit arrangement of the power amplifier is shown in Fig 3. The first stage is a differential amplifier comprising PNP two transistors (Q103, 107).

The pre-drive stage consists of ultra low capacitance transistors (Q113, Q115).

The power stage bias voltage is supplied by the transistor (Q117).

The power stage consists of drive transistors (Q119, Q121) and power transistors (Q125, Q127).

The power amplifer has a over-output current protection circuit. If current exceeding the specification flows through Q125 & Q127(L-ch), Q123 & Q135 Will conduct. As result Q133 will switch OFF, and the mute line will go low(MUTE). The thermal protection circuit consists of Transistors (Q134, Q138) and posistors (PO 101, PO 102). When heat sink temperature exceeds 80℃, Q136 & Q134 switch ON and the MUTE line goes low(MUTE).

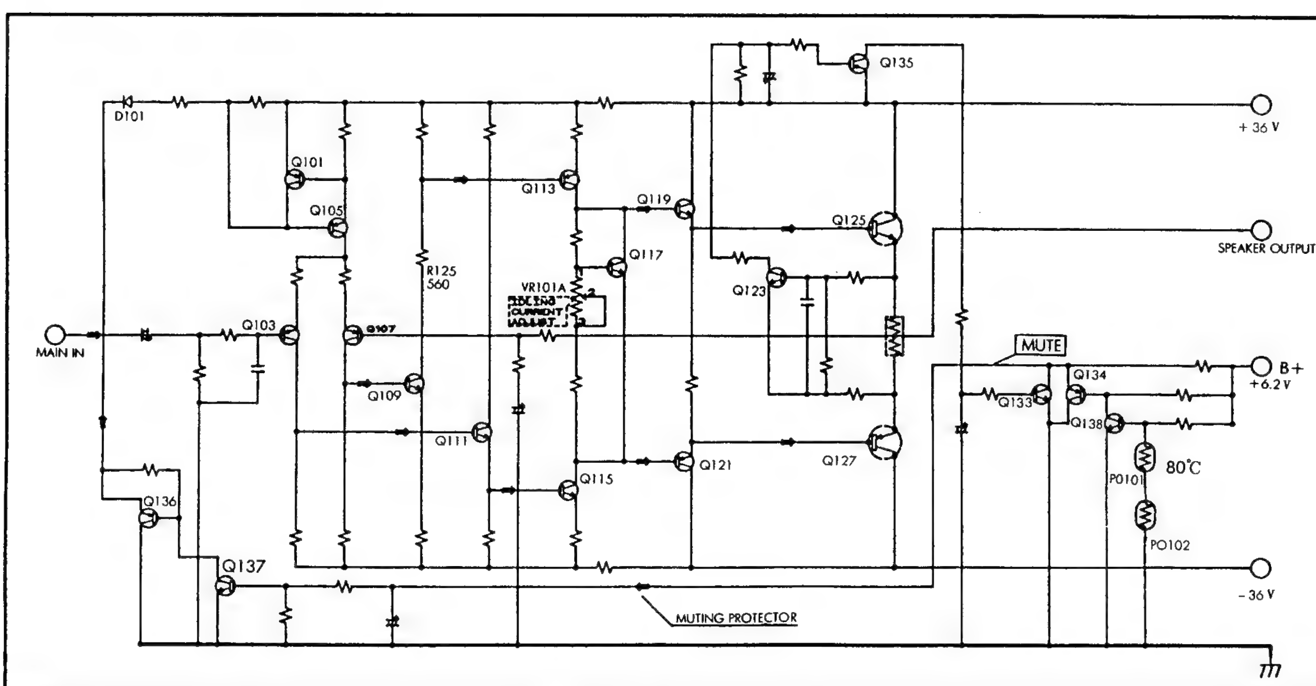
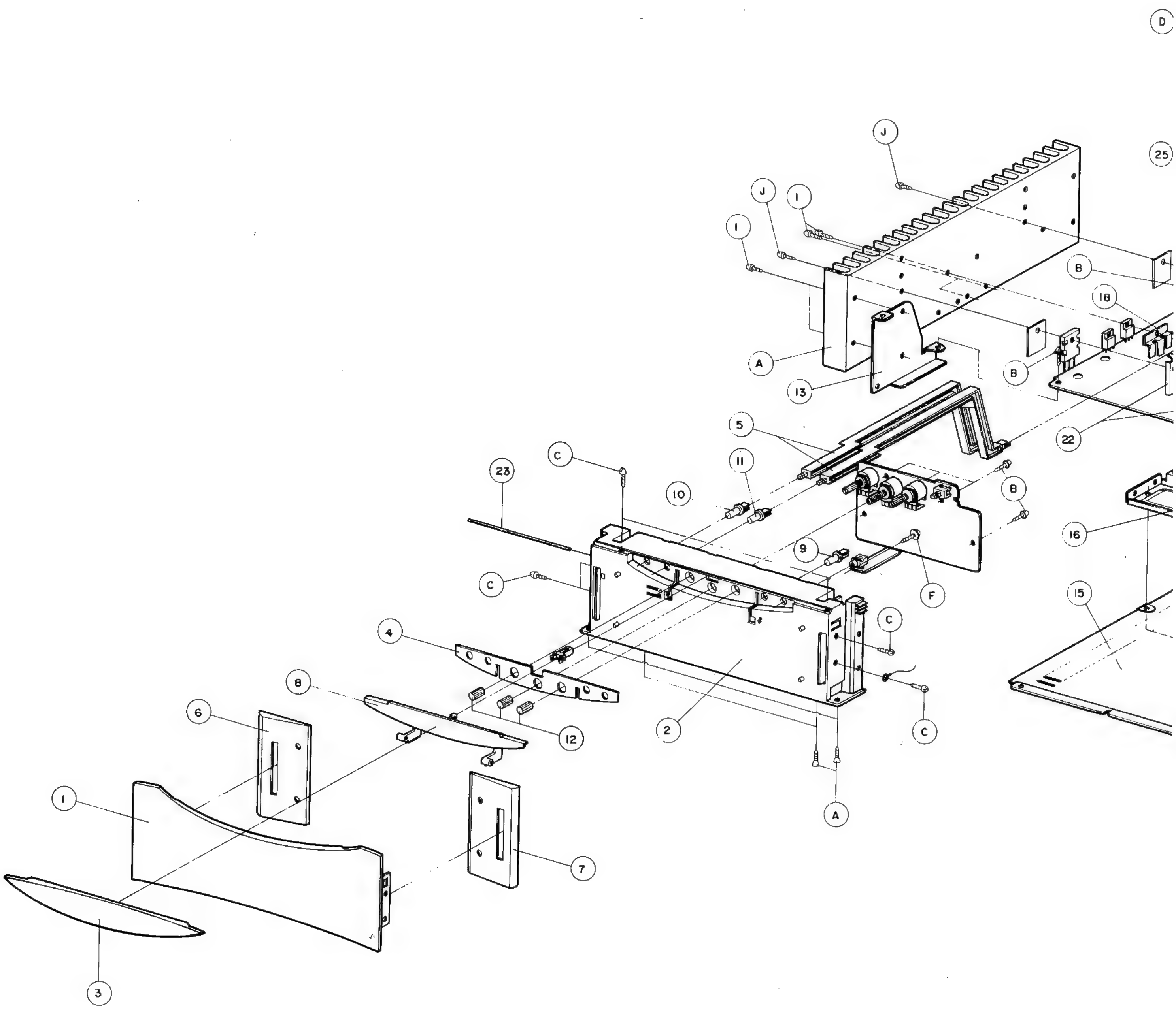
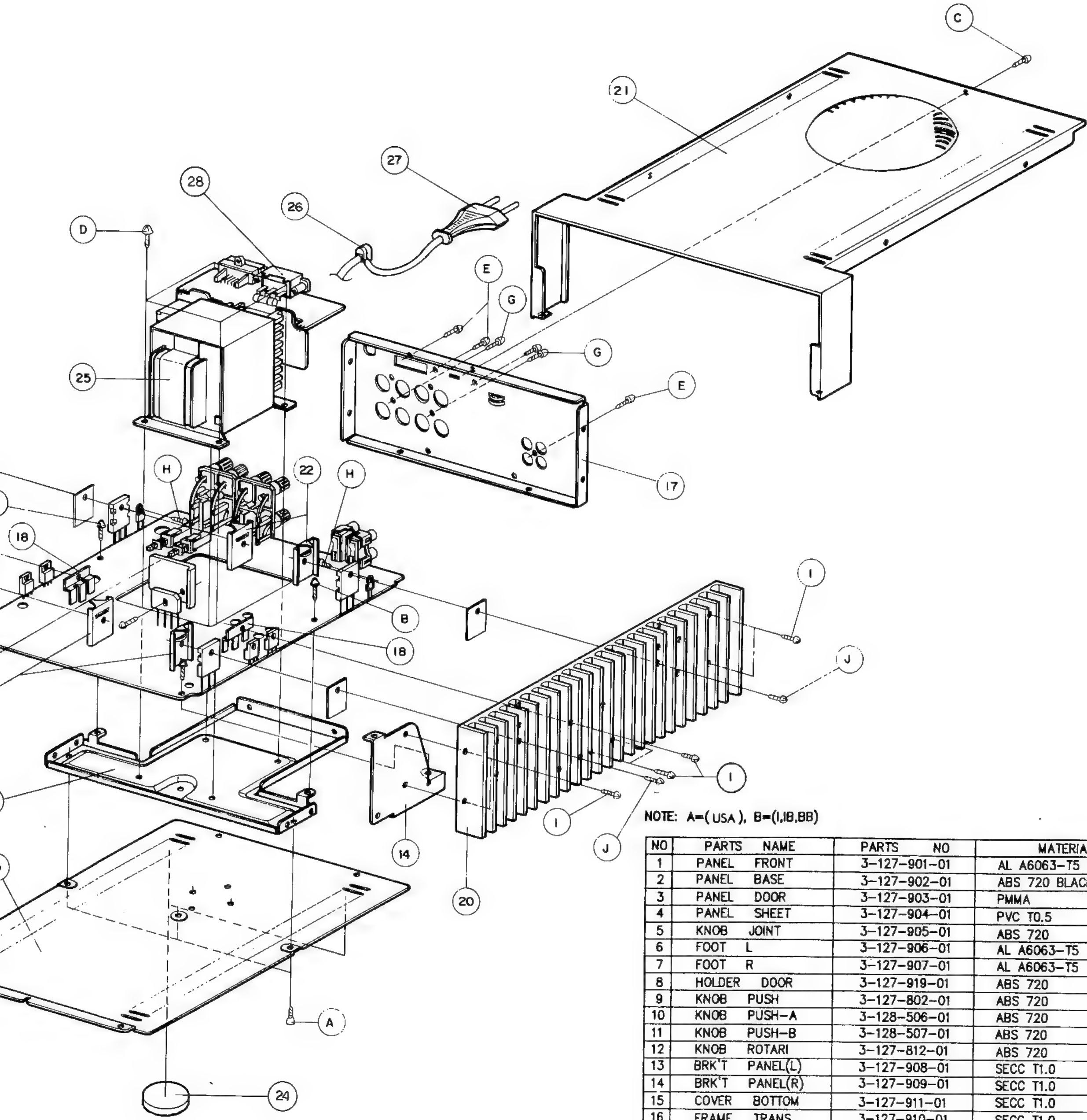


Fig. 3

EXPLODED VIEW

Amplifier : A 500





NOTE: A=(USA), B=(I,IB,BB)

NO	PARTS NAME	PARTS NO	MATERIAL	Q'TY	REMARK
1	PANEL FRONT	3-127-901-01	AL A6063-T5	1	A,B
2	PANEL BASE	3-127-902-01	ABS 720 BLACK	1	A,B
3	PANEL DOOR	3-127-903-01	PMMA	1	A,B
4	PANEL SHEET	3-127-904-01	PVC T0.5	1	A,B
5	KNOB JOINT	3-127-905-01	ABS 720	2	A,B
6	FOOT L	3-127-906-01	AL A6063-T5	1	A,B
7	FOOT R	3-127-907-01	AL A6063-T5	1	A,B
8	HOLDER DOOR	3-127-919-01	ABS 720	1	A,B
9	KNOB PUSH	3-127-802-01	ABS 720	1	A,B
10	KNOB PUSH-A	3-128-506-01	ABS 720	1	A,B
11	KNOB PUSH-B	3-128-507-01	ABS 720	1	A,B
12	KNOB ROTARI	3-127-812-01	ABS 720	3	A,B
13	BRK'T PANEL(L)	3-127-908-01	SECC T1.0	1	A,B
14	BRK'T PANEL(R)	3-127-909-01	SECC T1.0	1	A,B
15	COVER BOTTOM	3-127-911-01	SECC T1.0	1	A,B
16	FRAME TRANS	3-127-910-01	SECC T1.0	1	A,B
17	PANEL REAR	3-128-504-01	SECC T0.8	1	A
17	PANEL REAR	3-127-912-01	SECC T0.8	1	B
18	BRK'T TR-A	3-127-913-01	P.B T0.6	2	A,B
19	HEAT SINK(L)	3-127-914-01	AL A6063-T5	1	A,B
20	HEAT SINK(R)	3-128-503-01	AL A6063-T5	1	A,B
21	CASE BONNET	3-127-915-01	SECC T0.8	1	A,B
22	BRK'T TR-B	3-127-918-01	SECC T1.0	4	A,B
23	SHAFT	3-127-921-01	P12X105	1	A,B
24	FOOT CUSHION	3-127-924-01	SBR BLACK PI18XT6.5	1	A,B
25	POWER TRANS	2-131-494-02	120V 60Hz	1	A
25	POWER TRANS	2-131-488-01	230V,240V 50Hz	1	B
26	BUSHION S/RELIEF	8-201-118-01	HEYCO SR-15-1	1	A
26	BUSHION S/RELIEF	8-201-117-01	HEYCO SR-14-1	1	B
27	CORD AC	2-211-124-02	NDG-023-0	1	A
27	CORD AC	2-211-109-02	NDG-009 VDE	1	B
28	SWITCH SLIDE	2-211-124-02	NDG-023-0	1	B
A	SCREW	7-464-408-01	CBZ30P080FZK	13	A,B
B	SCREW	7-344-408-01	ATZ30P080FZK	8	A,B
C	SCREW	7-764-408-01	VBZ30P080FZK	11	A,B
D	SCREW	7-768-408-01	VBZ40P080FZK	4	A,B
E	SCREW	7-764-410-01	VBZ30P100FZK	3	A,B
F	SCREW	7-999-163-01	S30C	1	A,B
G	SCREW	7-999-166-01	PTB30P100FZK	2	A,B
H	SCREW	7-999-168-01	VBZ30P060FNC	2	A,B
I	SCREW	7-999-169-01	VBZ30P080FNC	18	A,B
J	SCREW	7-999-170-01	VBZ30P120FNC+SPRING	4	A,B

Amplifier A500

REF. No	Part No.	Description
	CHASSIS MISCELLANEOUS	
⚠ P1	221110902	AC LINE CORD (I, IB, BB)
	221112402	AC LINE CORD (USA)
⚠ T1	213148801	POWER TRANSFORMER (I, IB, BB)
	213149301	POWER TRANSFORMER (USA)
⚠ FU301	218862501	FUSE T1.6A/250V (I, IB, BB)
	218865501	FUSE F3.5A/125V (USA)
	PCB–1 MAIN P.C. BOARD	
	RESISTOR	
⚠ R167, 168	139021401	0.22Ω, 5W+5W
⚠ R171, 172, 173, 174	114110023	10Ω, 1W, ±5%
⚠ R401, 402	114168123	680Ω, 1W±5%
⚠ R179, 180	130447925	4.7Ω, 1/4W, ±5% FUSE
⚠ R145, 146, 151, 152	130447025	47Ω, 1/4W, ±5% FUSE
⚠ R177, 178	130433125	330Ω, 1/4W, ±5% FUSE
R184	111810425	100KΩ, 1/8W, ±5%
R188	111410425	100KΩ, 1/4W, ±5%
R111, 112	111410325	10KΩ, 1/4W, ±5%
R101, 102	111810225	1KΩ, 1/8W, ±5%
R163, 164	111410225	1KΩ, 1/4W, ±5%
R115, 116, 117, 118, 135, 136, 139, 140	111415225	1.5KΩ, 1/4W, ±5%
R147, 148, 149, 150	111822325	22KΩ, 1/8W, ±5%
R181	111822225	2.2KΩ, 1/8W, ±5%
R175, 176	111422025	22 Ω, 1/4W, ±5%
R121, 122	111427125	270 Ω, 1/4W, ±5%
R105, 106, 109, 110, 153, 154	111433325	33KΩ, 1/4W, ±5%
R190	111833225	3.3KΩ, 1/8W, ±5%
R107, 108, 159, 160	111433125	330 Ω, 1/4W, ±5%
R141, 142	111439125	390 Ω, 1/4W, ±5%
R193	111839225	3.9KΩ, 1/8W, ±5%
R191	111439225	3.9KΩ, 1/4W, ±5%
R186, 187	111847225	4.7KΩ, 1/8W, ±5%
R157, 158, 189	111447225	4.7KΩ, 1/4W, ±5%
R113, 114, 119, 120, 192	111447125	470 Ω, 1/4W, ±5%
R182	111847325	47KΩ, 1/8W, ±5%
R123, 124, 125, 126, 127, 128, 129, 130, 133, 134	111456125	560Ω, 1/4W, ±5%
R137, 138, 143, 144	111456025	56Ω, 1/4W, ±5%
R183, 185	111868325	68KΩ, 1/8W, ±5%
R155, 156	111882025	82 Ω, 1/8W, ±5%
R161, 162	111491125	910 Ω, 1/4W, ±5%
	CONTROLS	
VR101, 102	251247101	470Ω
	CAPACITOR	
C146, 147	141601065	1μF, ±20%, 50V, ELEC
C119, 120	141310065	10μF, ±20%, 16V, ELEC
C144, 145	141610065	10μF, ±20%, 50V, ELEC
C148	141210165	100μF, ±20%, 10V, ELEC
C129, 130, 131, 132	141422165	220μF, ±20%, 25V, ELEC
C105, 106	141347065	47μF, ±20%, 16V, ELEC
C123, 124	141447965	4.7μF, ±20%, 25V, ELEC
C113, 114, 115, 116, 133, 134	141647065	47μF, ±20%, 50V, ELEC
C111, 112	141147165	470μF, ±20%, 6.3V, ELEC
⚠ C135, 136	1991129011	8200μF, ±20%, 63V, ELEC
⚠ C143	1998104011	10000PF. ±5%, 250V (I, IB, BB)
	199810107	10000PF. ±5%, 250V (USA)
C121, 122	159910145	100PF. ±5%, 100V (I, IB, BB)
	188610145	100pF, ±5%, 50V (USA)
C709, 710	175610495	100000pF, + 80%, –20%, 50V
C701, 702, 705, 706, 707, 708, 721, 722	159915145	150PF. ±5%, 100V (I, IB, BB)
C117, 118	180602015	2pF, ±5%, 50V
C107, 108	159968045	680PF. ±5%, 100V (I, IB, BB)
	188668045	68pF, ±5%, 50V (USA)
C125, 126	150668345	68000pF, 5% 50V
C127, 128	150647345	47000pf, 5% 50V

REF. No	Part No.	Description
	TRANSISTORS	
⚠ Q125, 126	2402167111	2SC3280
⚠ Q127, 128	2400148111	2SA1301
Q115, 116	2402116411	2SC3787S
Q113, 114	2400117411	2SA1477S
Q119, 120	240217321	KTC4370Y
Q121, 122	240015121	KTA1659Y
⚠ Q129	240310621	KTD1351Y
⚠ Q130	240110321	KTB988Y
Q117, 118, 133, 138	240211135	KTC3198GR
Q101, 102, 105, 106, 134	240011835	KTC1266GR
Q109, 110, 111, 112, 123, 124, 137	240011825	KTC3200BL
Q103, 104, 107, 108, 135, 136	240011425	KTA1268BL
	F.E.T	
Q131, 132	2404118151	2SK373
	DIODES	
⚠ D107	2413621611	PBU603
⚠ D106	2413581651	1N4003L
D101, 102	241017995	1SS133
⚠ D103, 104	242113035	ZENER, 1N964, 13V
⚠ D105	242106245	ZENER, 1N753, 6.2V
	COILS	
L101, 102	212930501	0.7μH
	MISCELLANEOUS	
PO101, 102	2505121011	POSISTOR
S101, 102	220237301	PUSH SWITCH
SPEAKER TERMINAL	215577601	
INPUT JACK	215561801	
WA105	216813401	WAFER 3P
WA103, 104	216812201	WAFER 3P
WA101, 102	216812301	WAFER 4P
LUG	289960701	EARTH WIRE

PCB–2 CONTROL P.C. BOARD

REF. No	Part No.	Description
	CONTROLS	
VR201	250122021	250KΩ, MN
VR202, 203	250121901	100KΩ, 20C
	RESISTORS	
R251, 252	111810425	100KΩ, 1/8W, ±5%
R237, 238	111810325	10KΩ, 1/8W, ±5%
R217, 218, 221, 222	111410225	1KΩ, 1/4W, ±5%
R219, 220, 243, 244	111810125	100 Ω, 1/8W, ±5%
R201, 202	111812225	1.2KΩ, 1/8W, ±5%
R215, 216, 207, 208	111815425	150KΩ, 1/8W, ±5%
R209, 210	111815325	15KΩ, 1/8W, ±5%
R239, 240	111822425	220KΩ, 1/8W, ±5%
R231, 232	111822225	2.2KΩ, 1/8W, ±5%
R229, 230	111822125	220 Ω, 1/8W, ±5%
R223, 224	111827425	270KΩ, 1/8W, ±5%
R211, 212	111830225	3KΩ, 1/8W, ±5%
R213, 214, 225, 226, 253, 254	111833125	330 Ω, 1/8W, ±5%
R233, 234	111833025	33 Ω, 1/8W, ±5%
R205, 206, 235, 236	111847325	47KΩ, 1/8W, ±5%
R247, 248, 249, 250	111847925	4.7 Ω, 1/4W, ±5%
R245, 246	111856125	560 Ω, 1/8W, ±5%
R227, 228	111882025	82 Ω, 1/8W, ±5%
	CAPACITORS	
C219, 220	141610865	0.1μF, ±20%, 50V ELEC
C205, 206	141622965	2.2μF, ±20%, 50V ELEC

REF. No	Part No.	Description
C211, 212, 213, 214	141322065	22μF, ±20%, 16V ELEC
C225, 226	141647865	0.47μF, ±20%, 50V ELEC
C217, 218	141347065	47μF, ±20%, 16V ELEC
C209, 210	150615441	150000pF, ±5%, 50V
C207, 208	150636345	36000pF, ±5%, 50V
C201, 202	150630345	30000pF, ±5%, 50V
C223, 224	150647345	47000pF, ±5%, 50V
C203, 204	150656245	5600pF, ±5%, 50V
C215, 216	188633045	33pF, ±5%, 50V
C231, 232	188610045	10pF, ±5%, 50V
	TRANSISTORS	
Q201, Q202	240211135	KTC3198GR
Q203, 204, 205, 206	240011835	KTA1266GR
Q211, 212	240211825	KTC3200BL
Q209, 210	240011425	KTC1268BL
	F.E.T	
Q207, 208	2404111351	2SK246GR
	MISCELLANEOUS	
S201	220219801	PUSH SWITCH
CW103	215988902	CONNECTOR ASS'Y 3P
CW101	215979001	CONNECTOR ASS'Y 4P
CW102	215989202	CONNECTOR ASS'Y 4

PCB–3 POWER RELAY P.C. BOARD

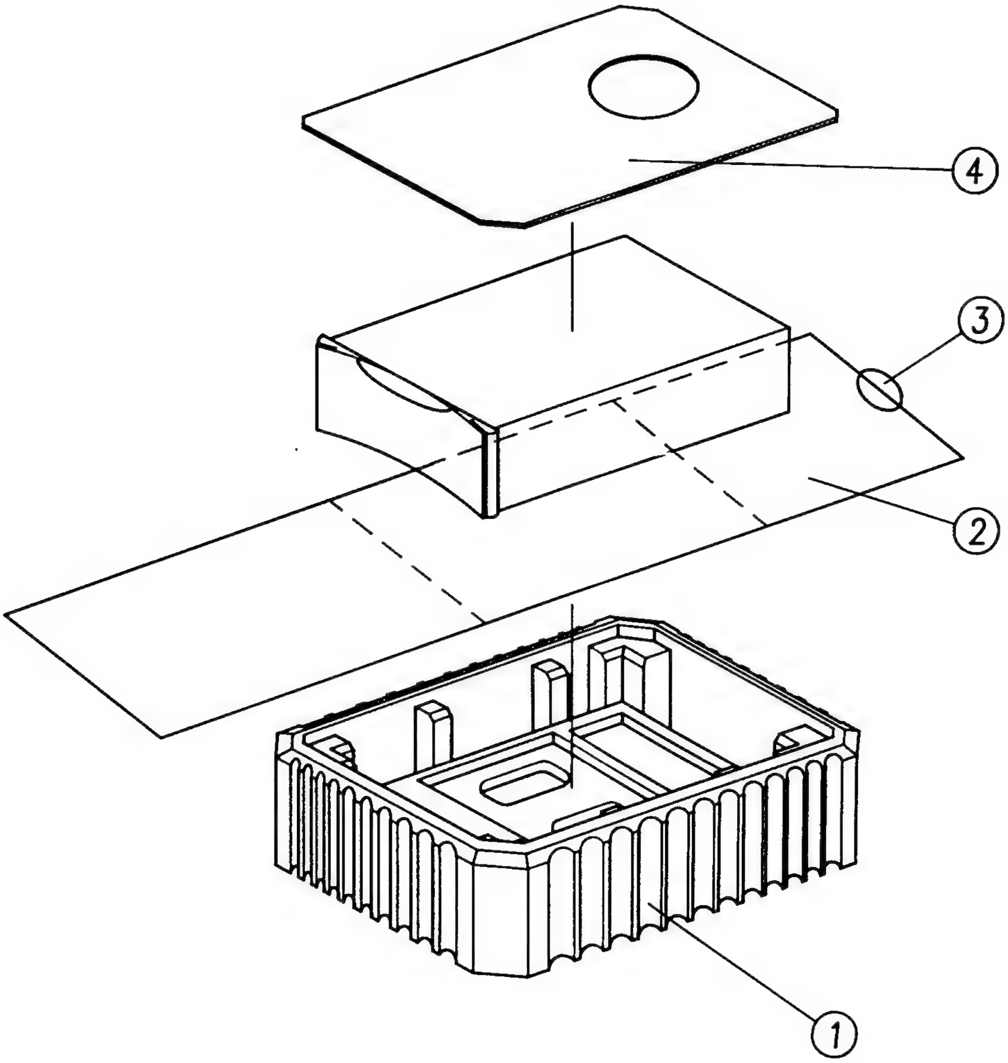
REF. No	Part No.	Description
	RESISTOR	
⚠ R304	114110023	10Ω, 1W
R302	111410325	10KΩ, 1/4W, ±5%
R303	111815225	1.5KΩ, 1/8W, ±5%
R301	111847225	4.7KΩ, 1/8W, ±5%
	CAPACITOR	
C301	141601065	1μF, 20%, 50V, ELEC
⚠ C302	1998104011	10000PF. ±5%, 250V (I. IB. BB)
	199810107	10000PF. ±5%, 250V (USA)
	TRANSISTORS	
Q301, 302	240211135	KTC3198GR
	DIODE	
D301	241017995	1SS133
	RELAY	
⚠ RY301	2140225021	JW1AFSN-DC12V
	MISCELLANEOUS	
⚠ S301	219017901	SLIDE SWITCH (I.IB.BB)
CW105	215998201	CONNECTOR ASS'Y 3P

PCB–4 HEADPHONES P.C. BOARD

REF. No	Part No.	Description
PHONES JACK	215565001	3P MINI JACK
CW104	215964301	CONNECTOR ASS'Y 3P

PACKING DRAWING

Amplifier : A-500

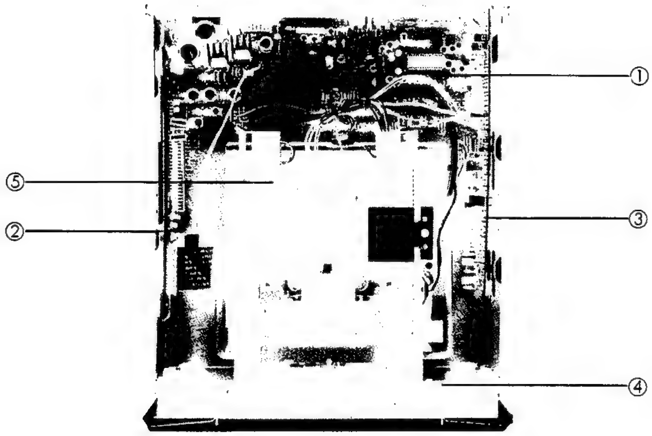


NO	PARTS NAME	PARTS NO.	Q'TY
1	PAD BOTTOM	3-127-916-01	1
2	SHEET POLY	3-324-029-01	1
3	STICKER SET	3-819-817-01	1
4	INNER LID	3-324-019-01	1

5 HK-C300

INTERNAL VIEW

■ TOP VIEW



① PCB-1 Main p.c.board
② PCB-2 Main p.c.board
③ PCB-3 Main P.c.board
④ PCB-4 Control p.c.board
⑤ Deck Mechanism

DISASSEMBLY PROCEDURES

1 TOP Cover Removal

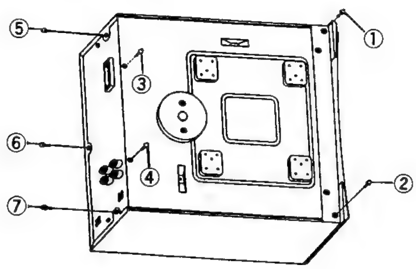


Fig. 1

1. Remove screws ① to ⑦ in Fig. 1
2. Remove the top cover

2 Rear Panel Removal

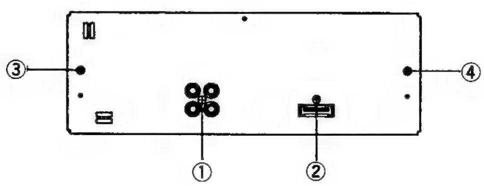


Fig. 2

1. Remove screws ① to ④ in Fig. 2, and then remove the rear panel.

3 PCB-⑮,⑯,⑰ (Main PCB) Removal

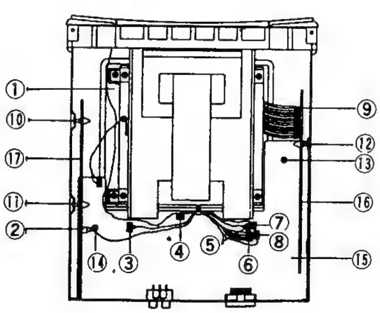


Fig. 3

1. Remove the rear panel in Fig. 2 (Refer to step 2)
2. Remove connectors ① to ⑨, and then remove pcb supports ⑩ to ⑫ in Fig. 3
3. Remove screws ⑬ to ⑭, and then remove the pcb-1 ⑮, pcb-2 ⑯ and pcb-3 ⑰

4 Front Panel Assembly Removal

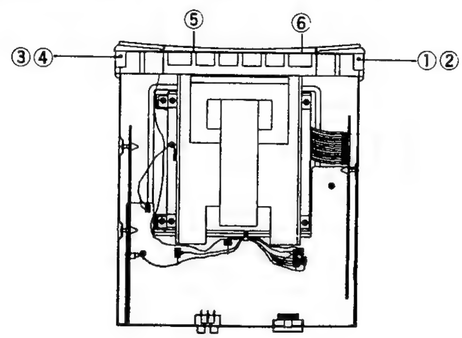
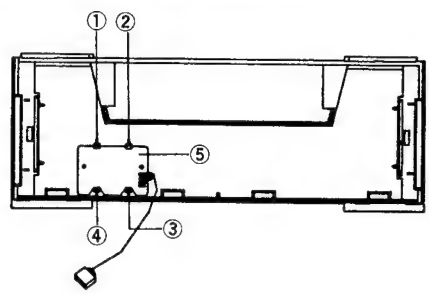


Fig. 4

1. Remove screws ① to ⑥ in Fig. 4
2. Remove the front panel assembly by pulling it toward you gently

5 PCB-⑤(Control PCB)Removal.



Fig・5

1. Remove the front panel assembly (Refer to step 4)
2. Pulling hooks ① to ④ in Fig・5, and then remove the contrel pcb ⑤

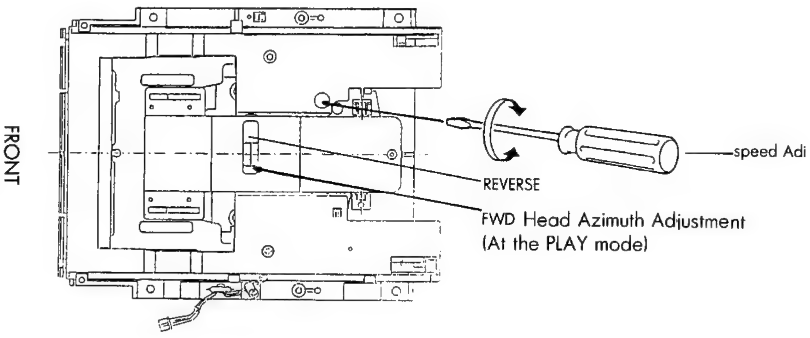
ALIGNMENT PROCEDURES

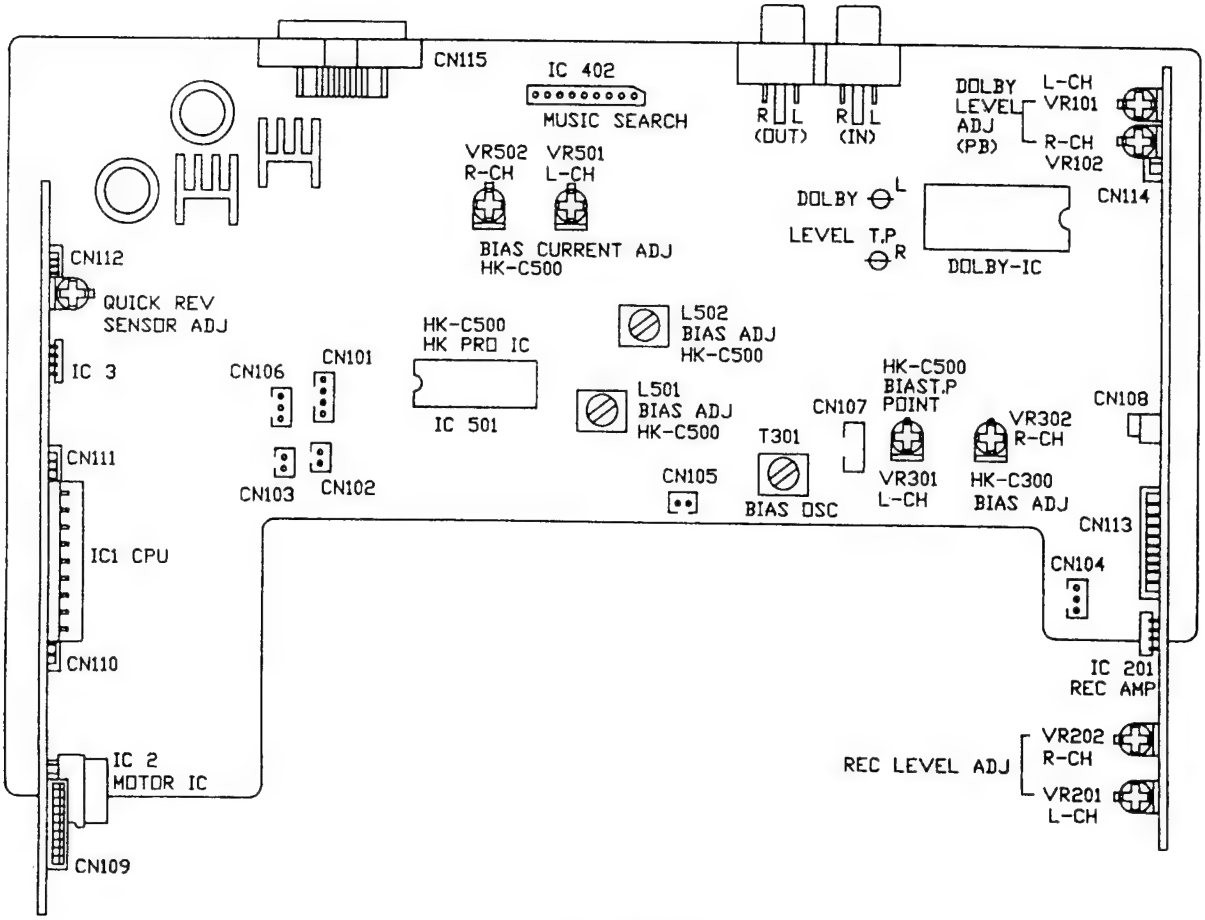
Tape Deck : C300/C500

STEP	Alignment	Instrument Required	Input Signal	Mode	Test point	Adjustment	FOR
1	Azimuth	VTVM Oscilloscope Test tape (MTT-114 or TCC-154)		PB	OUTPUT jack	Azimuth screw	Maximum output Refer to "Azimuth Adjustment" on page 62
2	Tape speed	Frequency counter Test tape (MTT-111DN or TCC-112)		PB	OUTPUT jack	VR(bulit-in motor)	3000Hz ±10Hz Adjust at the center of test tape.
3	Playback output level	VTVM Test tape (TCC-130 or (MTT-150)		PB	OUTPUT jack	VR101 VR102	365mV-15mV, +40mV
4	Playback frequency characteristic confir-mation	VTVM Test tape (TCC-162B and TCC-262B)		PB	OUTPUT jack	R131~ R136	Unsolder resistors of R131 and R132, R133 and R134, or R135 and R136 so that the frequsncy response is within the range as shown in page 62
5	Bias frequency con-firmation	Frequency counter		REC/PB	ERASE HEAD	T301	105KHz ±3KHz Tape selector is METAL position
6	Dolby HX PRo (HK-C500) At the HK-C300 BIAS CURRENT Adj	VTVM		REC/PB BIAS TRIM BIAS CEN- TER		L 501 L 502 VR501 VR502 VR301 VR302	Maximum output Tape selector is METAL position After adjustment for L501 and L502, set bias fine trim(VR501 and VR502) to the center position. VR301, VR302 is center position.
7	Record level (pre-adjustment)	VTVM Blank tapes NORMAL:AC-224(TDK) CrO2 :XL-II(MAXELL) METAL:MX(MAXELL)	Apply 1KHz signal to INPUT jack. OUTPUT voltage is 365mV in RECOR-DING mode.	REC / PB	OUTPUT jack	VR201 VR202	365mV Tape selector is CrO2 Position. Adjust VR201 and VR202 so that the distortion becomes 0.8% This confirmation should be at each tape selector position.
8	Record/playback EQ frequency response	VTVM Blank tapes NORMAL:AC-224 CrO2:XL-II METAL:MX	Apply 1kHz signal to INPUT jack. OUT-PUT voltage is 20dB below 365 mV in RECORDING mode. Them adjust with a 20Hz to 20kHz	REC/PB	OUTPUT jack	(HK-C500) VR501 VR502 L 501 L 502 (HK-C300) VR301 VR302	So that the record/playback fre-quency response is flat (at least within the range in ± 3dB) This confirmation should be at each tape selector position. Preform cheking with Dolby B and C NR ON at each tape selector position.

MECHANICAL ADJUSTMENT

Tape Speed, Azimuth			
Mode	Test tape	Adjustment position	Specification rating(playback frequency)
PLAY	Play TCC-154 tape(12.5 kHz)	Head Azimuth Screw Adj	45 degree (fig · A)





C300/C500 : Adjustment point

■ ELECTRICAL ADJUSTMENT AND CONFIRMATION

1. Before adjustment

- After the power switch is pushed on, wait for 10 minutes before measuring to be sure of the most stable operation.

- Since head magnetization, dust accumulations etc are likely to introduce errors in the various characteristics, it is very important that the heads are properly demagnetied and cleaned before commencing any adjustment, particulauly frequency response and head azimuth adjustment.

2. Instruments required

- Low frequency oscillator
- AC VTVM or dual channel AC VTVM
- Oscilloscope
- Wow/Flutter meter
- Frequency counter

3. Test tapes

- Azimuth adjustment .... MTT-114 or TCC-154
- Tape speed adjustment MTT-111 orTCC-112
- Playback output level adjustment TCC-130 (200nWb)
- Playback frequency characteristic confirmation
  ....TCC-162B and TCC -262B
- Reference tapes
  LN (TDK) AC-224
  CrO2 -(MAXELL) .... XL-II
  METAL (MAXELL)... MX

Note:
C-90 differes with C-60 in the thickness and bias.
Adjust with the tape as specified.

4. General conditions (unless otherwise noted)

Controls and Switches	Setting
Dolby NR	off

Azimuth Adjustment

When the maximum level point of R channel is not the same as L channel, connect the oscilloscope as shown in Fig A and proceed with azimuth adjustment so that L and R channels are in phase.

a) Connect L channel tape out to "X (orH)" and R channel to "Y (orV)". Observe the lissajous waveform.
b) Set L and R channels to monaural. Adjust vertical and horizontal gain so that the waveform becomes 45degree.
c) Adjust azimuth so that the mesurement of "a" becomes maximum and the measurement of "b" becomes minimum against the 45 degree Line.
d) apply lock tight to head Azimuth Screw

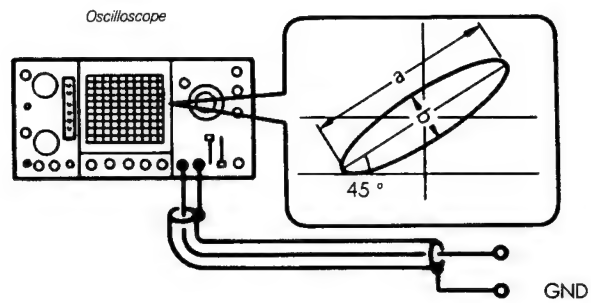
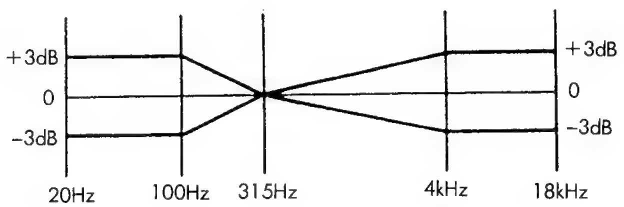
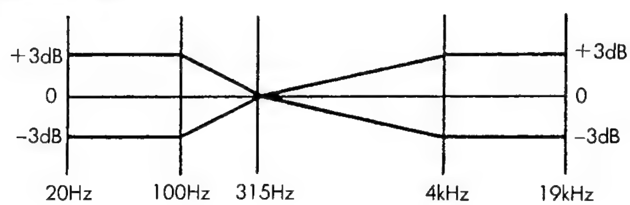


Fig. A

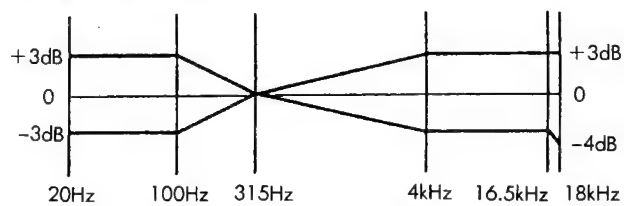
PLAYBACK FREQUENCY CHARACTERISTIC
TEST TAPE:TCC-162B, TCC-262B



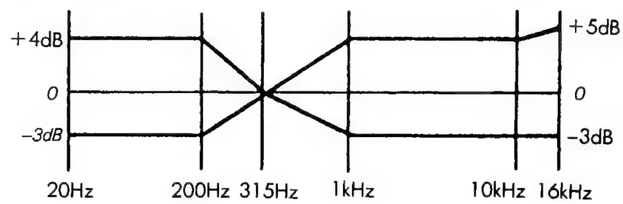
RECORD/PLAYBACK FREQUENCY CHARACTERISTIC
TEST TAPE:AC-224, XL-II, MX
DOLBY NR:OFF



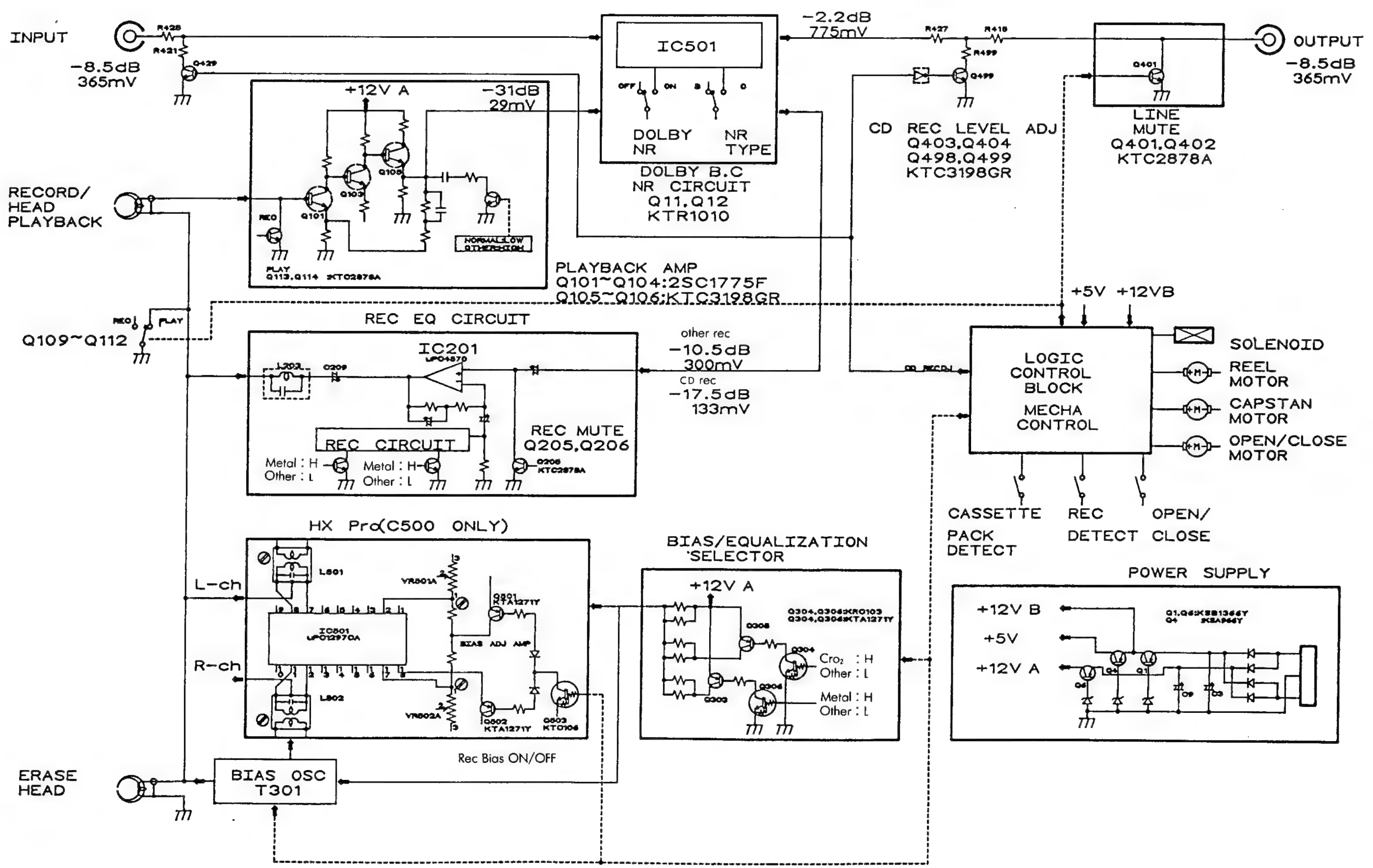
RECORD/PLAYBACK FREQUENCY CHARACTERISTIC
TEST TAPE :AC-224, XL-II, MX
DOLBY NR :TYPE B ON



RECORD/PLAYBACK FREQUENCY CHARACTERISTIC
TEST TAPE:AC-224, XL-II, MX
DOLBY NR:TYPE C ON



C-300/500 TAPE DECK BLOCK DIAGRAM



PLAYBACK SIGNAL

The signal from the playback head is amplified by the playback amplifier Q101, Q103 and Q105 (L-ch), and is applied to the pins 3(L-ch) and 28 (R-ch) of the Dolby NR IC401 (B/C type). Switching of the playback signal from the record mode (external input signal) to the playback mode is performed inside IC401.
IC401 is usually switched to the playback mode. However, the control signal transmitted to the pin 26 of IC401 from IC1 through Q13 switches IC401 from the record mode to the play mode. The input signal to IC401 is output from the pins 9(L-ch)and 22(R-ch) and applied to the OUTPUT jack. The characteristics of the playback equalizer are defined by the BIAS/EQUALIZATION switch and are selected and specified in Q119(L-ch) and Q120(R-ch)

RECORD SIGNAL

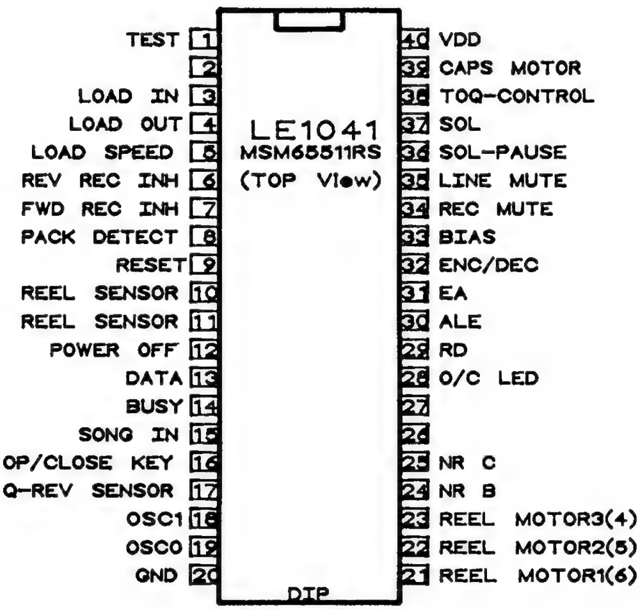
The signal from the INPUT jack is controlled by the Q429(CD REC level Adj) and is applied to pins 1(L-ch)and 30(R-ch) of the Dolby NR IC401 (B/C type). Switching of the record signal from the playback mode to the record mode is performed inside IC401. The control signal transmitted to the pin26 of IC401 from IC1 through Q13 switches IC401 from the playback mode to the record mode.
The input signal to the Dolby IC is output from pin 15(L-ch) and pin16(R-ch). The signal output from IC401 passes through the record equalizer circuit and is amplified by the record amplifier of IC201. The amplified signal is then applied to the recording head after being synthesized by a bias signal.

MUTING OPERATION

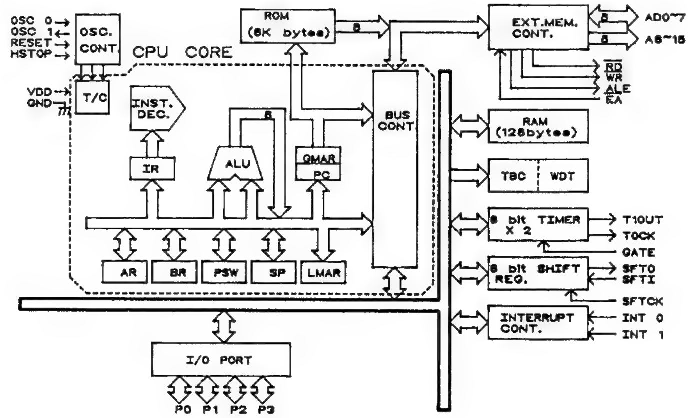
The signal that mutes the sound produced at switching to recording or playback is applied from IC1 of the logic control block.
When the "MUTE"button is pressed, the signal output from the pin35 of IC1 turns ON Q401(L-ch) and Q402 (R-ch) to short-circuit the output signals of the playback amplifiers for muting.

IC FUNCTION BLOCK DIAGRAM

IC1 : MICRO COMPATER



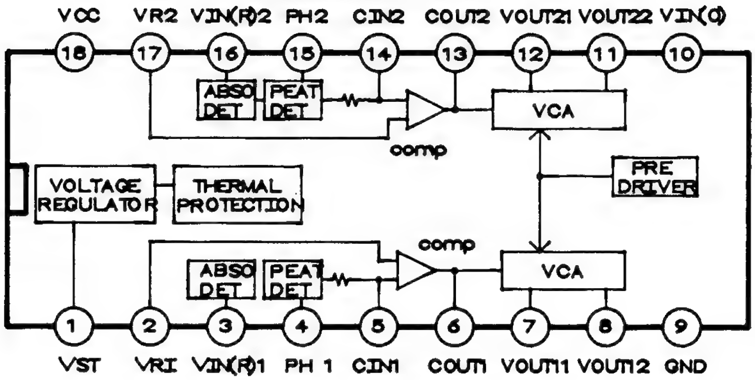
IC1 : CPU CONTROL LE-1041



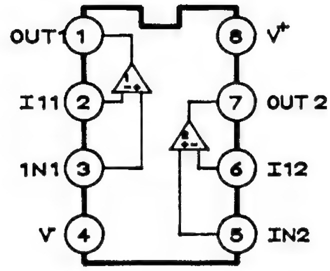
PIN No.	Port name	Function name	I/O	Outline of Functions
3	P3.2	LOAD IN SW	I	LOADING CLOSE - LOW
4	P3.3	LOAD OUT SW	I	LOADING OPEN - HIGH
5	P3.4	LOAD SPEED CONT SW	I	CLOSE PACK SLIDE DOWN - LOW
6	P3.5/SFTO	REV REC INH	I	REV RECORDING INHIBIT TERMINAL
7	P3.6/SFTI	FWD REC INH	I	FWD //
8	P3.7	PACK DETECT	I	TAPE DETECTOR INPUT TERMINAL
9	RESET	RESET		SYSTEM RESET TERMINAL.
10	P2.0	REEL SENSOR	I	SENSING PULSE INPUT TERMINAL
11	P2.1	REEL SENSOR	I	
12	P2.2/INITO	POWER OFF	I	POWER ON/OFF DETECTION TERMINAL . LOW LEVEL-OFF
13	P2.3/INIT1	DATA	I/O	SYSTEM CONTROL SIGNAL I/O TERMINAL
14	P2.4	BUSY	I/O	
15	P2.5	SONG INPUT	I	INPUT TERMINAL FOR SONG INTERVAL DETECTION.
16	P2.6/WR	OP/CLOSE KEY	I	DOOR OPEN/CLOSE TOGGLE KEY INPUT . LOW ACTIVE
17	P2.7	Q-REV SENSOR	I	TAPE END/START POINT DETECTION
18	OSC1	OSC2		4MHz RESONATOR CONNECTING TERMINAL.
19	OSCO	OSC1		
20	GND	GND		GND TERMINAL.
21	P1.0/A8	REEL MOTOR(6)	O	BA6238A 4PIN CPU 23PIN
22	P1.1/A9	REEL MOTOR(5)	O	BA6238A 5PIN CPU 22PIN
23	P1.2/A10	REEL MOTOR(4)	O	BA6238A 6PIN CPU 21PIN
24	P1.3/A11	NR (DOLBY)	I	DOLBY FUNCTION CONTROL.
25	P1.4/A12	NR (DOLBY)	I	
28	P1.7/A15	O/C LED	O	LOW ACTIVE
32	P0.7/AD7	ENC/DEC	O	PLAY - HIGH REC - LOW
33	P0.6/AD6	BAIS	O	REC - HIGH
34	P0.5/AD5	REC MUTE	O	REC MUTE-LOW
35	P0.4/AD4	LINE MUTE	O	LINE MUTE - HIGH
36	P0.3/AD3	SOL PAUSE	O	LOW VOLTAGE OUTPUT TERMINAL FOR SOLENOID DRIVE.
37	P0.2/AD2	SOLENOID	O	SOLENOID ACTIVE - HIGH
38	P0.1/AD1	TOQ-CONTROL	O	POWER CONTROL HIGH LEVEL - POWER DOWN.
39	P0.0/AD0	CAPSTAN MOTOR	O	OUTPUT TERMINAL FOR CAPSTAN MOTOR DRIVE.
40	VDD	VDD		+5 (POWER SUPPLY TERMINAL)

PIN	No.	F.P	R.P	FF	REW	STOP	OPEN	CLOSE
4	L	H	L	H	L	L	L	L
5	L	L	L	L	L	L	H	H
6	H	H	H	H	H	L	H	L

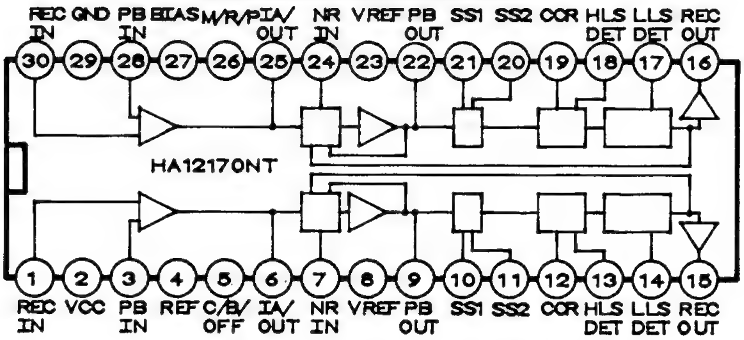
IC501 : HX PRO UPC1297CA



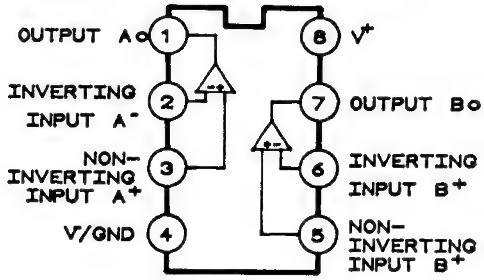
IC201 : REC EQ UPC 4570



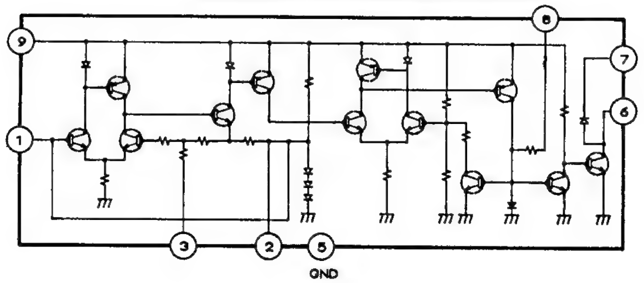
IC401 : DOLBY B.C NR HA12170NT



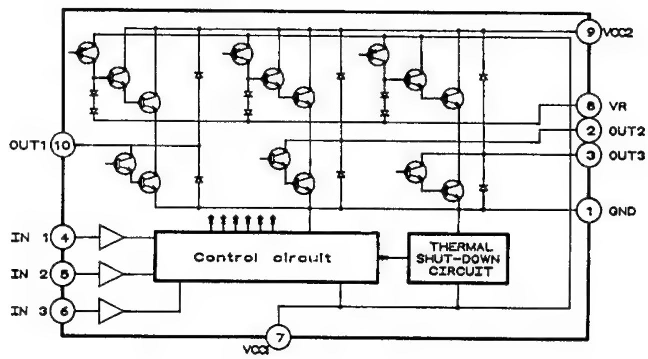
IC3 : Q-REV SENSOR BA10393



IC402 : MUSIC SEARCH LA 2000

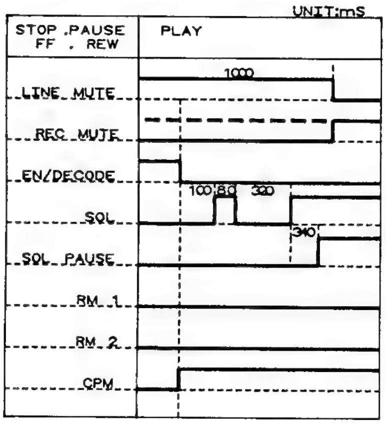


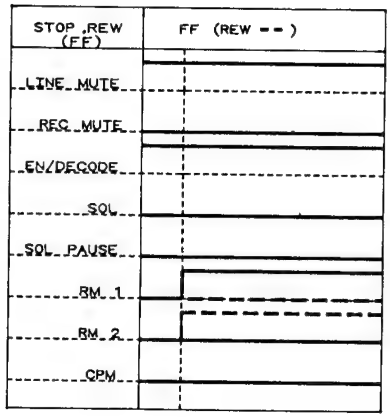
IC2 : MOTOR DRIVER BA6238A

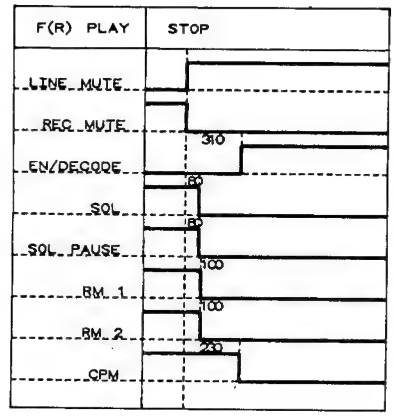


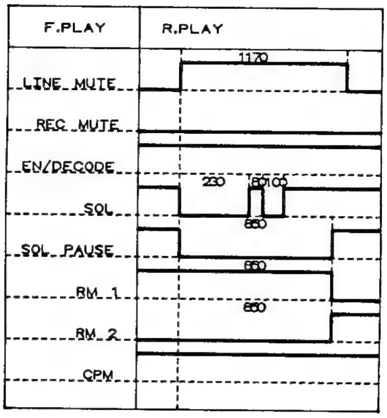
TIMING CHART

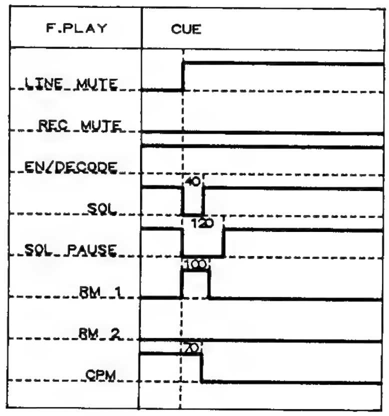
Tape Deck : C300/500

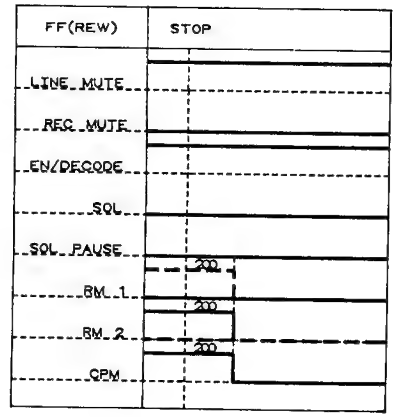


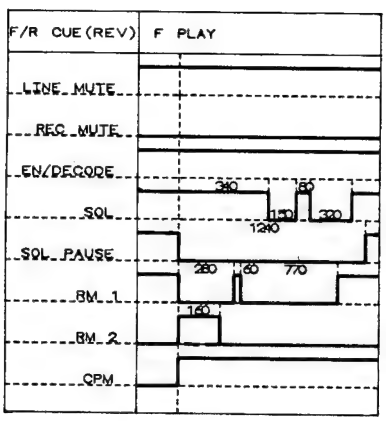


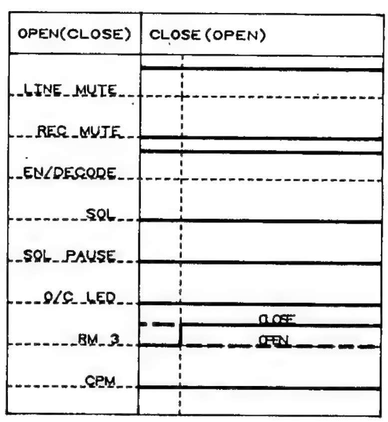








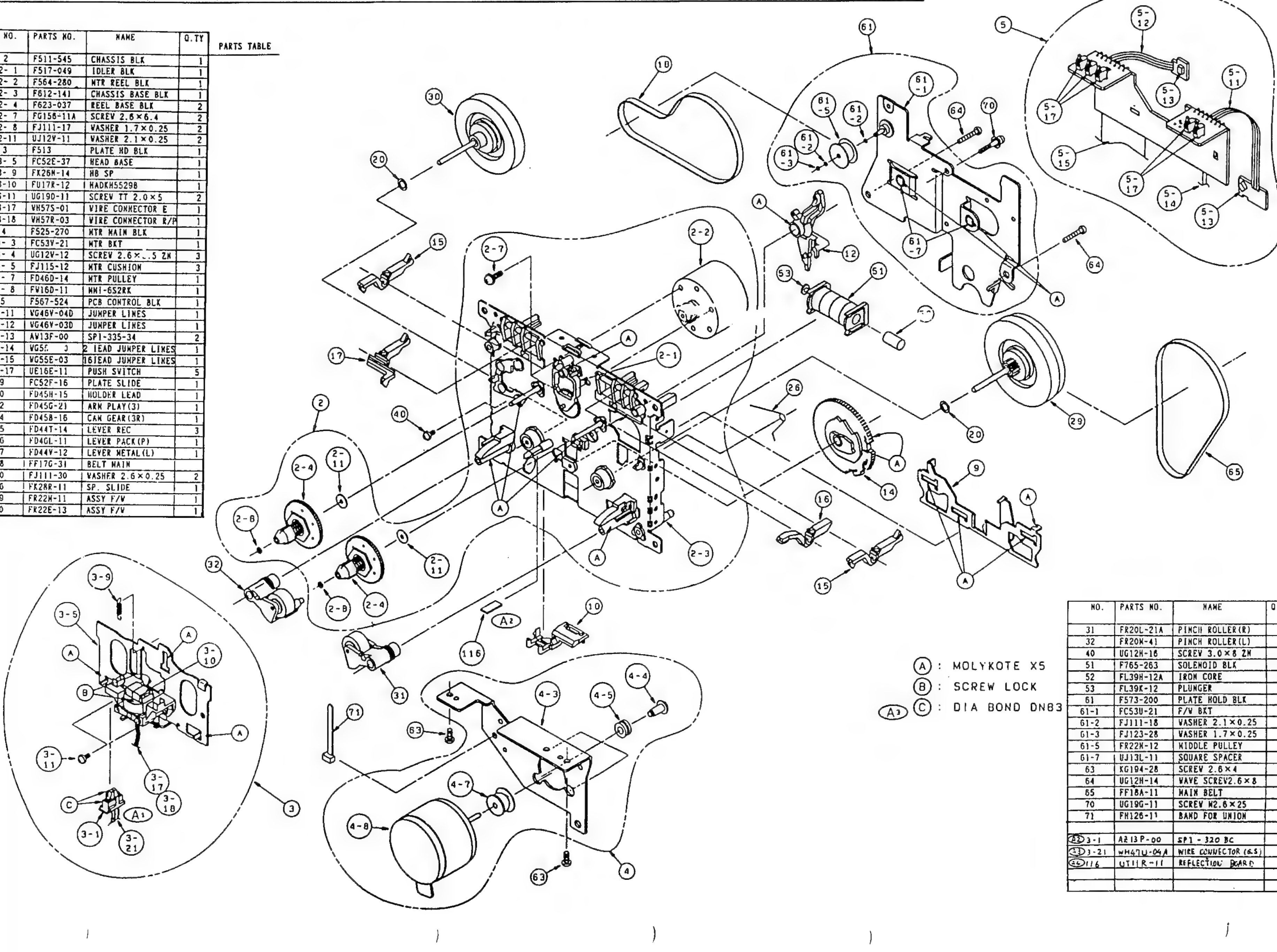




TAPE DECK MECHANISM EXPLODE VIEW

PARTS TABLE

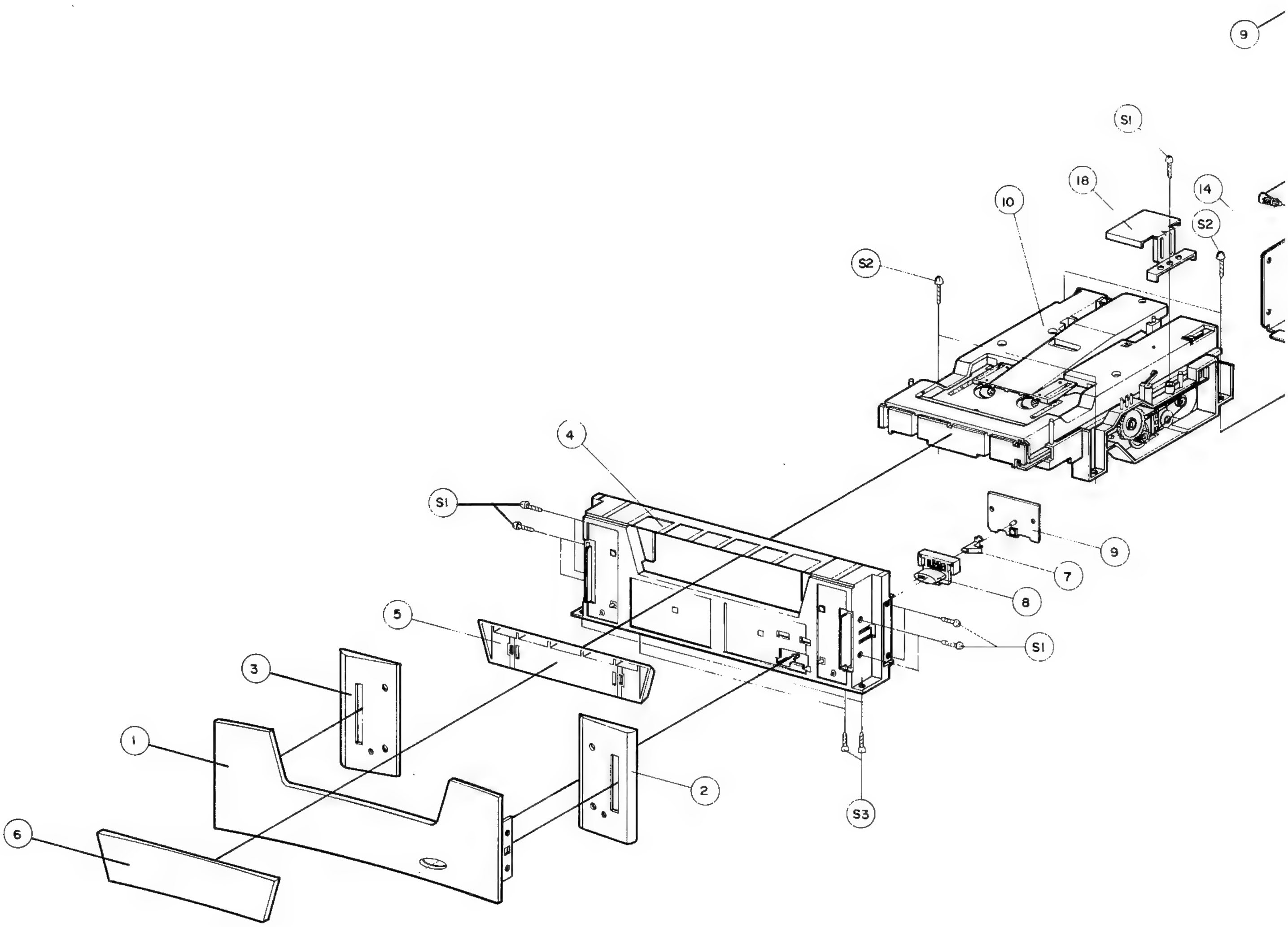
NO.	PARTS NO.	NAME	Q.TY
2	F511-545	CHASSIS BLK	1
2- 1	F517-049	IDLER BLK	1
2- 2	F564-280	MTR REEL BLK	1
2- 3	F612-141	CHASSIS BASE BLK	1
2- 4	F623-037	REEL BASE BLK	2
2- 7	FG158-11A	SCREW 2.6×6.4	2
2- 8	FJ111-17	WASHER 1.7×0.25	2
2-11	UJ12V-11	WASHER 2.1×0.25	2
(31) 3	F513	PLATE HD BLK	1
3- 5	FC52E-37	HEAD BASE	1
3- 9	FX26N-14	HB SP	1
3-10	FU17R-12	HADKH55298	1
3-11	UG190-11	SCREW TT 2.0×5	2
3-17	WH57S-01	WIRE CONNECTOR E	1
3-18	WH57R-03	WIRE CONNECTOR R/P	1
4	F525-270	MTR MAIN BLK	1
4- 3	FC53V-21	MTR BKT	1
4- 4	UG12V-12	SCREW 2.6×..5 ZN	3
4- 5	FJ115-12	MTR CUSHION	3
4- 7	FD46D-14	MTR PULLEY	1
4- 8	FW16D-11	MMI-6S2RK	1
5	F567-524	PCB CONTROL BLK	1
5-11	WG46V-04D	JUMPER LINES	1
5-12	WG46V-03D	JUMPER LINES	1
5-13	AW13F-00	SP1-335-34	2
5-14	WG5[illegible]	2 LEAD JUMPER LINES	1
5-15	WG55E-03	16LEAD JUMPER LINES	1
5-17	UE16E-11	PUSH SWITCH	5
9	FC52F-16	PLATE SLIDE	1
10	FD45H-15	HOLDER LEAD	1
12	FD45G-21	ARM PLAY(3)	1
14	FD45B-16	CAM GEAR(3R)	1
15	FD44T-14	LEVER REC	3
16	FD4GL-11	LEVER PACK(P)	1
17	FD44V-12	LEVER METAL(L)	1
18	FF17G-31	BELT MAIN	
20	FJ111-30	WASHER 2.6×0.25	2
26	FX28R-11	SP. SLIDE	1
29	FR22H-11	ASSY F/W	1
30	FR22E-13	ASSY F/W	1

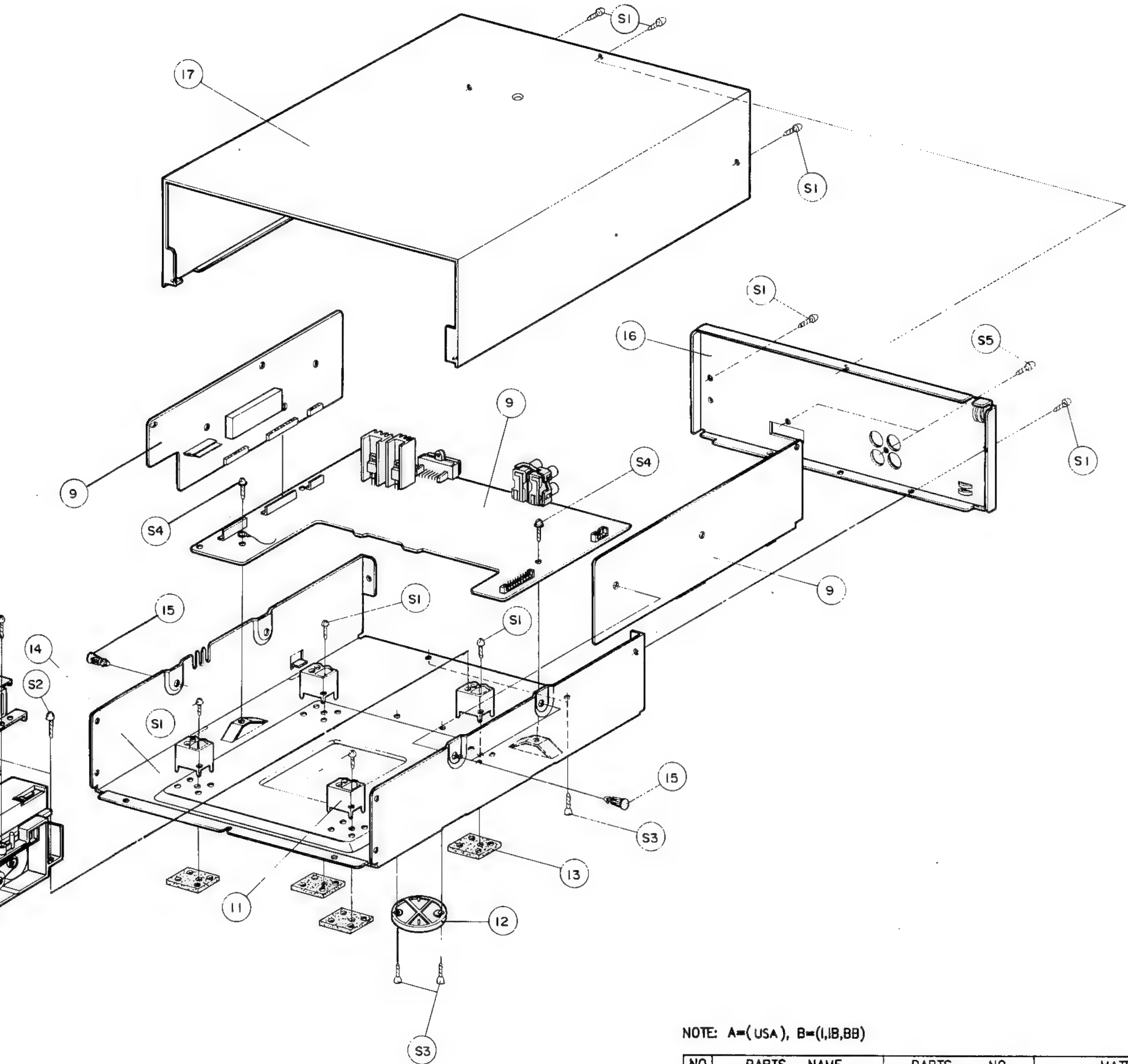


NO.	PARTS NO.	NAME	Q.TY
31	FR20L-21A	PINCH ROLLER(R)	1
32	FR20K-41	PINCH ROLLER(L)	1
40	UG12H-18	SCREW 3.0×8 ZN	1
51	F765-263	SOLENOID BLK	1
52	FL39H-12A	IRON CORE	1
53	FL39K-12	PLUNGER	1
61	F573-200	PLATE HOLD BLK	1
61-1	FC53U-21	F/W BKT	1
61-2	FJ111-18	WASHER 2.1×0.25	2
61-3	FJ123-28	WASHER 1.7×0.25	1
61-5	FR22K-12	MIDDLE PULLEY	1
61-7	UJ13L-11	SQUARE SPACER	2
63	KG194-28	SCREW 2.6×4	2
64	UG12H-14	WAVE SCREW2.6×8	2
65	FF18A-11	MAIN BELT	1
70	UG19G-11	SCREW M2.6×25	1
71	FH126-11	BAND FOR UNION	1
(A2) 3-1	A213P-00	SP1 - 320 BC	1
(A3) 3-21	WH47U-04A	WIRE CONNECTOR (6.5)	1
(A4) 116	UT11R-11	REFLECTION BOARD	1

EXPLODED VIEW

Tape Deck : C-300/500





NOTE: A=(USA), B=(I,IB,BB)

NO	PARTS NAME	PARTS NO	MATERIAL	Q'TY	REMARK
1	PANEL FRONT	3-324-003-01	AL A6063-T5	1	A,B
2	FOOT R	3-127-907-01	AL A6063-T5	1	A,B
3	FOOT L	3-127-906-01	AL A6063-T5	1	A,B
4	PANEL BASE	3-324-017-02	ABS-720 94-HB	1	A,B
5	DOOR HOLDER	3-324-007-02	ABS-720 94-HB	1	A,B
6	DOOR COVER	3-324-004-01	AL A6063-T5	1	A,B
7	LENS KNOB	3-324-012-02	SBR(K-REGIN)94-HB	1	A,B
8	KNOB TACT	3-819-804-01	ABS-720 94-HB	1	A,B
9	PCB ASS'Y	A-170-857-01	MAIN	1	A,B
10	DECK MECHANISM	2-216-109-01	HM-100LM DENON	1	A,B
11	MECHA FOOT	3-324-010-01	ABS-720 94-HB	4	A,B
12	FOOT REAR	3-324-011-01	ABS-720 94-HB	1	A,B
13	COVER SCREW	3-324-027-01	EVA GRAY	4	A,B
14	CHASSIS MAIN	3-324-016-02	SECC 1.0T	1	A,B
15	SUPPORT PCB	3-810-520-01	NYLON 66	3	A,B
16	PANEL REAR(C500)	3-324-015-11	SECC 0.8T	1	A,B
16	PANEL REAR(C300)	3-324-102-11	SECC 0.8T	1	A,B
17	TOP COVER	3-324-014-01	SECC 0.8T	1	A,B
18	MECHA BRK'T	3-324-502-01	SECC 1.2T	1	A,B
S1	SCREW	7-764-408-01	VBZ30P080FZK	16	A,B
S2	SCREW	7-768-420-01	VBZ40P200FZK	4	A,B
S3	SCREW	7-464-408-01	CBZ30P080FZK	8	A,B
S4	SCREW	7-344-408-01	ATZ30P080FZK	2	A,B
S5	SCREW	7-764-410-01	VBZ30P100FZK	2	A,B

Tape Deck : C-300/500

REF. No	Part No.	Description
	PCB-1 MAIN P.C. BOARD	
	INTEGRATED CIRCUITS	
IC402	244131372	LA2000 MUSIC SEARCH
IC501 (C500)	2442241541	UPC1297CA HX Pro
IC401	2440929321	HA12170NT DOLBY B.C
	TRANSISTORS	
Q401, 402, 498, 499	240215415	KTC2878A
⚠ Q1, 6	240111221	KTB1366Y
Q4	240014025	KTA966AY
Q303, 305 (501, 502 : C500)	240010825	KTA1271Y
Q2, 3, 5, 7, 8, 301, 302 403, 404, 405, 497	240211135	KTC3198GR
Q10, 13	240611115	KSR1010 R1=10KΩ
Q9, 18, 19, 307 (503 : C500)	240612715	KSC106M R1=4.7KΩ R2=47KΩ
Q14, 66	240612615	KRA106M R1=4.7KΩ R2=47KΩ
Q304, 306	240610415	KRC103M
Q308	240210925	KTC1627A-Y, PA,
	DIODES	
⚠ D5, 6, 9, 12, 13, 301, 303, 304 (501, 502 : C500)	241017995	1SS133
⚠ D1, 2, 3, 4, 302	2413581651	1N4003L
D7, 11	2426128851	ZENER, HZ12B2LTA
D8	242106245	ZENER, 1N753A
D10	242105135	ZENER, 1N751A
	COILS	
T301 (C500)	212935201	BIAS OSC, 105KHz
T301 (C300)	212921501	RTF-057-0, LINE
L501, 502 (C500)	213850801	126AN-6750 HX-Pro
	CONTROLS	
VR501, 502 (C500)	251210301	10KB
VR301, 302 (C300)	251210401	100KB
	RESISTORS	
R1, 11	111415225	1.5 KΩ, 1/4W, ±5%
R2, 12	111447125	470 Ω, 1/4, W, ±5%
R3, 13, 412	111410125	100 Ω, 1/4, W, ±5%
R4	130410925	1 Ω, 1/4, W, ±5%, FUSE
R5 8, 9, 81, 82, 83, 415, 416, 89	111810225	1KΩ, 1/8, W, ±5%
R6	111847125	470Ω, 1/8W, ±5%
R7	111810125	100Ω, 1/8W, ±5%
R10, 22, 23, 318, 313 (508 : C500)	111810325	10KΩ, 1/8W, ±5%
R14	111427925	2.7Ω, 1/4W, ±5%
R88	111847025	47Ω, 1/8W, ±5%
⚠ R302, 303	111847925	4.7Ω, 1/8W, ±5%
R304, 305, 320	111833225	3.3KΩ, 1/8W, ±5%
R306	111439125	390Ω, 1/4W, ±5%
R307	111447125	470Ω, 1/4W, ±5%
R308, 309	111462125	620Ω, 1/4W, ±5%
R310, 311	111439025	39Ω, 1/4W, ±5%
R312, 316, 319, 398, 399, 405, 406, 409, 410 494 (503, 504, 510 : C500)	111822325	22KΩ, 1/8W, ±5%
R314, 315	111868225	6.8Ω, 1/8W, ±5%
R403, 404	111856225	5.6KΩ, 1/8W, ±5%
R407, 408	111856125	560Ω, 1/8W, ±5%
R411	111818325	18KΩ, 1/8W, ±5%
R417, 418	111822225	2.2KΩ, 1/8W, ±5%
R419, 420	111882225	8.2KΩ, 1/8W, ±5%
R421, 422	111830225	3KΩ, 1/8W, ±5%
R423, 424, 429, 430, 495, 496, 497 (507, 509 : C500)	111847225	4.7KΩ, 1/8, ±5%
R425, 426	111833325	33KΩ, 1/8, ±5%
R427, 428	111818225	1.8KΩ, 1/8, ±5%
R431	111856425	560KΩ, 1/8, ±5%
R432	111868125	680Ω, 1/8, ±5%
R433	111818125	180Ω, 1/8, ±5%
R434	111882125	820Ω, 1/8, ±5%
R498, 499	111836225	3.6KΩ, 1/8, ±5%
R501, 502 (C500)	111818425	180KΩ, 1/8, ±5%
R505, 506 (C500)	111815325	15KΩ, 1/8, ±5%

REF. No	Part No.	Description
	MISCELLANEOUS	
SW999	220899901	KHH-10910 TACT SW
CN101	216812301	NKC-023-0, 4P
CN106, 107	216817901	B3B-XH, JST
CN102, 103, 104, 105	216825201	FKN1039-A, JST
CN115	216846901	52303-1311, 13P
JP102	215561801	RCA JACK, GOLD, WHITE, RED, 4P
HEA101, 102	371070203	40MM, AL, HEAT SINK
	CAPACITORS	
C1, 2, 436	175647395	47000pF, ±20%, 50V
△ C3	141447267	4700μF, ±20%, 25V, ELEC
C4, 10	141347167	470μF, ±20%, 16V, ELEC
C5, 11	141310267	1000μF, ±20%, 16V, ELEC
C7	141247165	470μF, ±20%, 10V, ELEC
C8 (515 : C500)	141610065	10μF, ±20%, 50V, ELEC
C9	141422267	2200μF, ±20%, 25V, ELEC
C12, 516	141647965	4.7μF, ±20%, 50V, ELEC
C13, 401, 402, 413, 414, 418	141601065	1μF, ±20%, 50V, ELEC
C301	150E82245	0.0082μF, ±5%, 400V
C302	150610345	0.01μF, ±5%, 50V
C303, 304	150633245	0.0033μF, ±5%, 50V
C305, 403, 404, 405, 406, 407, 408	150622245	0.0022μF, ±5%, 50V
C306	141422065	22μF, ±20%, 25V, ELEC
C409, 410, 411, 412, 422, 423, 434, 435 514, 517	141610865	0.1μF, ±20%, 50V, ELEC
C415, 416	141622965	2.2μF, ±20%, 50V, ELEC
C420, 421	141310065	10μF, ±20%, 16V, ELEC
C419, 437	141322065	22μF, ±20%, 16V, ELEC
C431, 432	188618145	180pF, ±5%, 50V
C433	141647865	0.47μF, ±20%, 50V, ELEC
C501, 502 (C500)	188639145	390pF, ±5%, 50V
C503, 504 (C500)	188F18155	180pF, ±5%, 500V
C505, 506 (C500)	150647345	0.047μF, ±5%, 50V
C507, 508 (C500)	150622345	0.022μF, ±5%, 50V
C509, 510 (C500)	188610345	10000pF, ±5%, 50V
C511, 512 (C500)	188682145	820pF, ±5%, 50V
C513 (C500)	188F10145	100pF, ±5%, 500V
C999	175610395	10000pF, ±20%, 50V

PCB-2 SUB P.C. BOARD

REF. No	Part No.	Description
	INTEGRATED CIRCUITS	
IC201	244220541	UPC4570C
	TRANSISTORS	
Q101, 102, 103, 104	2402179651	2SC1775FTZ
Q113, 114, 205, 206	240215415	KTC2878A, RF/SW
Q109, 110, 111, 112	240211815	KTC3200GR
Q105, 106, 115	240211135	KTC3198GR
Q12, 13, 20, 21	240611115	KSR1010, R1=10KΩ
Q116, 119, 120, 121, 201, 202	240612715	KRC106M R1=4.7KΩ R2=47KΩ
Q117	240612615	KRA106M R1=4.7KΩ R2=47KΩ
Q118	240011425	KTA1268BL
Q203, 204	240610415	KRC103M
	DIODES	
D101, 103, 201, 202	241017995	1SS133, TP
D102	2426105851	ZENER, HZ11B2LTA
	COILS	
L101, 102	212938701	22mH, ±10%, CHOKE
L201, 202	101147221	NTH-030-0, 4.7mH, ±5%
L203, 204	212926101	NTH-061-0, BIAS TRAP
	CONTROLS	
VR101, 102, 201, 202	2514203011	20KB, EVNDCAA0SB24

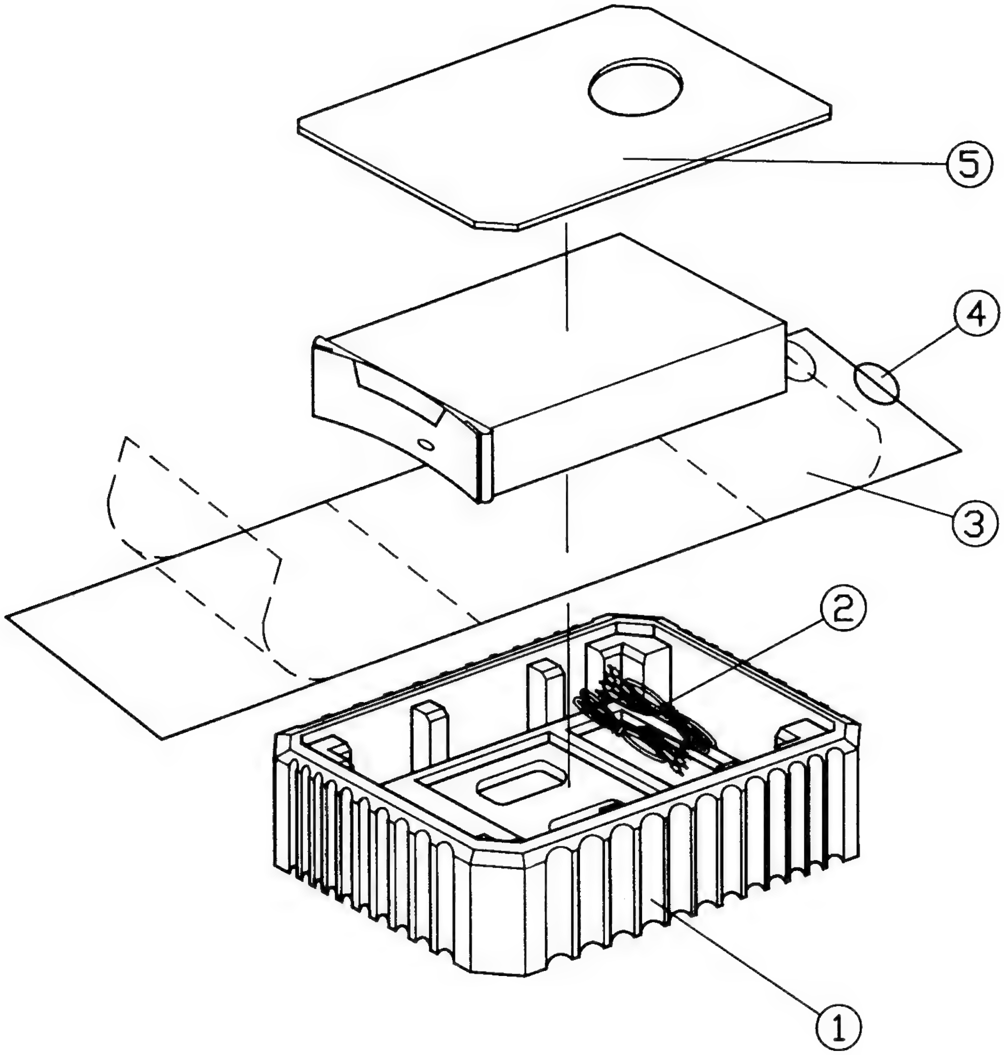
REF. No	Part No.	Description
	RESISTORS	
R27	111410125	100Ω, 1/4W, ±5%
R117, 118	111810225	1KΩ, 1/8W, ±5%
R101, 102	111810125	100Ω, 1/8W, ±5%
R103, 104	111822325	22KΩ, 1/8W, ±5%
R105, 106	111833125	330Ω, 1/8W, ±5%
R107, 108, 203, 204,	111856225	5.6KΩ, 1/8W, ±5%
R109, 110	111847025	47Ω, 1/8W, ±5%
R137, 138, 139, 140, 143, 144, 150, 151 152, 219, 220, 221, 222, 215, 216	111810325	10KΩ, 1/8W, ±5%
R145, 146, 207, 208	111822325	22KΩ, 1/8, ±5%
R111, 112	111822425	220KΩ, 1/8, ±5%
R113, 114	111868125	680Ω, 1/8, ±5%
R119, 120	111836225	3.6KΩ, 1/8, ±5%
R227, 228	111833225	3.3KΩ, 1/8, ±5%
R121, 122	111868425	680KΩ, 1/8, ±5%
R123, 124	111891225	9.1KΩ, 1/8, ±5%
R125, 126	111882125	820Ω, 1/8, ±5%
R127, 128, 141, 142	111839225	3.9KΩ, 1/8, ±5%
R131, 132	111824225	2.4KΩ, 1/8, ±5%
R147	111447925	4.7Ω, 1/4, ±5%
R148	111410225	1KΩ, 1/4, ±5%
R149	111822225	2.2KΩ, 1/8, ±5%
R205, 206	111847225	4.7KΩ, 1/8, ±5%
R209, 210	111833325	33KΩ, 1/8, ±5%
R211, 212 (C300)	111815125	150Ω, 1/8, ±5%
R211, 212 (C500)	111818125	180Ω, 1/8, ±5%
R213, 214 (217, 218 :(C500)	111815225	1.5KΩ, 1/8, ±5%
R129, 130	111810525	1MΩ, 1/8, ±5%
R115, 116	111833125	330Ω, 1/8, ±5%
R201, 202, 225, 226	111868225	6.8KΩ, 1/8, ±5%
R223, 224	111882325	82KΩ, 1/8, ±5%
R217, 218(C300)	111824225	2.4KΩ, 1/8, ±5%
	CAPACITORS	
C101, 102	188633145	330pF, ±5%, 50V
C103, 104	141447965	4.7μF, ±20%, 25V, ELEC
C107, 108, 201, 202	150662245	0.0062μF, ±5%, 50V
C109, 110	150668245	0.0068μF, ±5%, 50V
C111, 112, 116	141310065	10μF, ±20%, 16V, ELEC
C113, 114	150612245	0.0012μF, ±5%, 50V
C117	141333065	33μF, ±20%, 16V, ELEC
C115	141347167	470μF, ±20%, 16V, ELEC
C203, 204	141601065	1μF, ±20%, 50V, ELEC
C205, 206	141610065	10μF, ±20%, 50V, ELEC
C207, 208	141615865	0.15μF, ±20%, 50V, ELEC
C209, 210	141647965	4.7μF, ±20%, 50V, ELEC
C211, 212	150612345	0.012μF, ±5%, 50V
C219, 220	150622245	0.0022μF, ±5%, 50V
C213, 214	150620345	0.02μF, ±5%, 50V
C255, 266	150610345	0.01μF, ±5%, 50V
C257, 258	150675245	0.0075μF, ±5%, 50V
C315, 216	150618345	0.018μF, ±5%, 50V
	MISCELLANEOUS	
CN108	216845401	B6B-XH-A JST
CN110	2168385011	53178-1110, 11P,
CN112, 114	2168382011	53178-0510, 5P
CN111, 113	2168387011	53178-1510, 15P

PCB-3 SUB P.C. BOARD

REF. No	Part No.	Description
	RESISTORS	
R21	111818125	180Ω, 1/8, ±5%, TP
	MISCELLANEOUS	
JP101	21597B901	2.5MM, 4P, L=450 CONNECTOR
D999	241949345	R34MC F02, LED,

PACKING DRAWING

Tape Deck : C-300/500

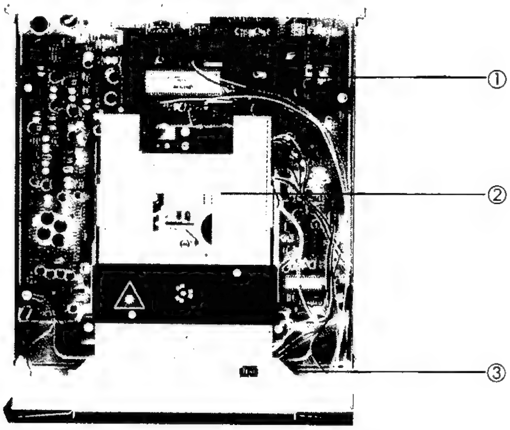


NO	PARTS NAME	PARTS NO.	Q'TY
1	PAD BOTTOM	3-127-916-01	1
2	PIN CORD	2-212-140-01	2
3	SHEET POLY	3-324-029-01	1
4	STICKER SET	3-819-817-01	1
5	INNER LID	3-324-019-01	1

4 HK-CD 300/500

INTERNAL VIEW

■ **TOP VIEW**



① PCB-1 Main p.c.board
② PCB-2 Control p.c.board
③ CD Mechanism

DISASSEMBLY PROCEDURES

1 TOP Cover Removal

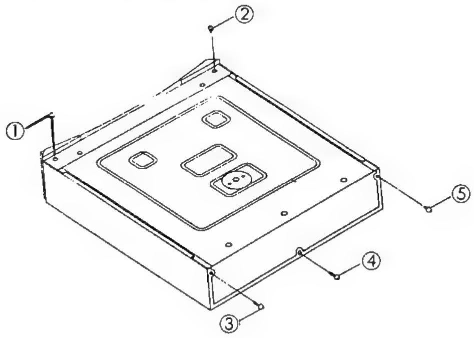


Fig. 1

1. Remove screws ① to ⑤ in Fig. 1
2. Remove the top cover

2 Rear Panel Removal

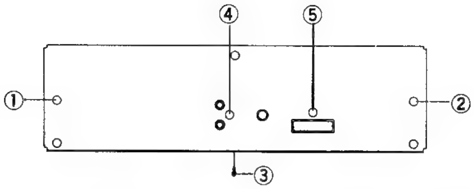


Fig. 2

1. Remove screws ① to ⑤ in Fig. 2 , and then remove the rear panel

3 PCB-⑫ (Main PCB) Removal

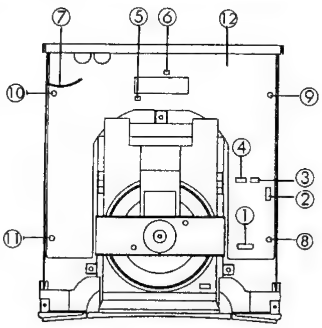


Fig. 3

1. Remove the rear panel (Refer to step 2)
2. Remove connectors ① to ⑥ in Fig · 3 , and then unsolder the ground wire ⑦ which is connected the side frame (L)
3. Remove screws ⑧ to ⑪ in Fig. 3 , and then remove main pcb ⑫ by pulling it to backward

4 Front Panel Assembly Removal

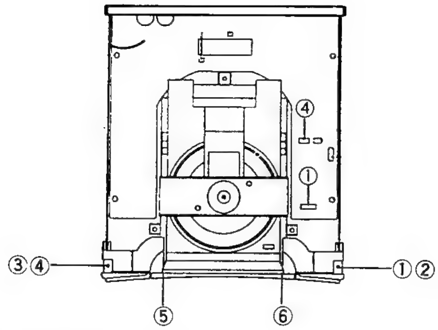


Fig. 4

1. Remove screws ① to ⑥ in Fig · 4.
2. Remove the front panel assembly by pulling it toward you gently

5 PCB-⑤ (Control PCB) Removal.

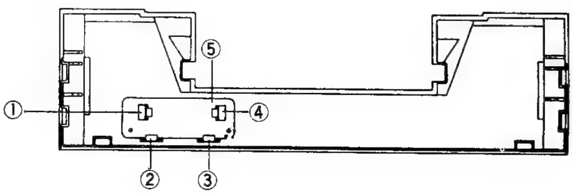


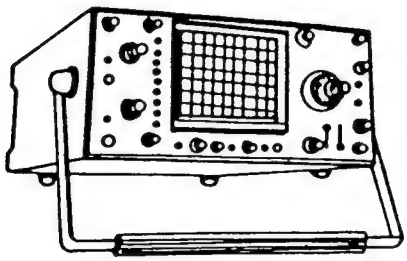
Fig · 5

1. Remove the front panel assembly (Refer to step 4)
2. Pull hooks ① to ④ in Fig · 5, and then remove the control pcb ⑤

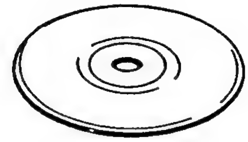
CDP:CD 300/500

1. METER AND JIG FOR ADJUSTMENT

1–1. Oscilloscope

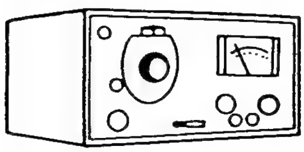


1–2 Test disc (Sony type 4:YEDS–18)

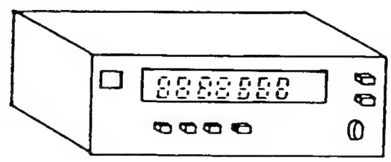


1–3. Jitter meter

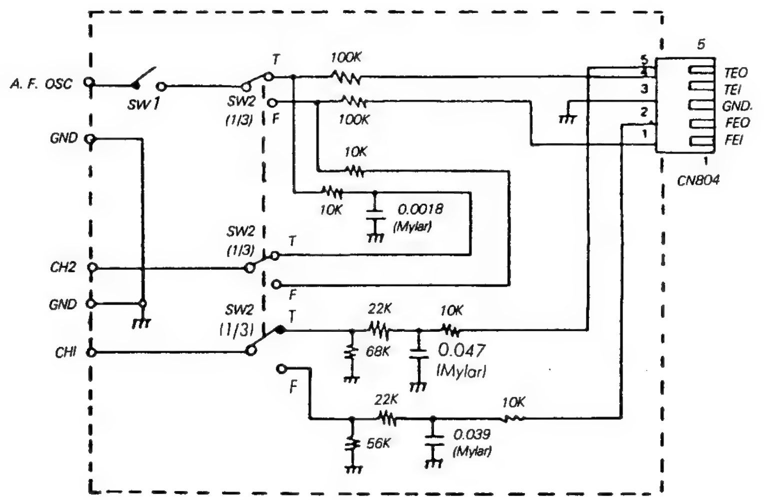
1–4. Low frequency oscillator



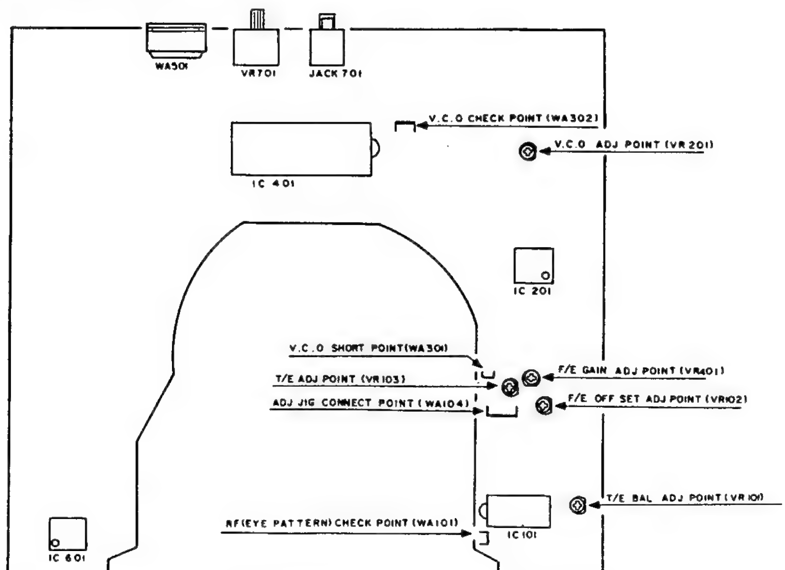
1–5. Digital frequency counter



1–6. 10:1 Oscilloscope probe
1:1 Oscilloscope probe



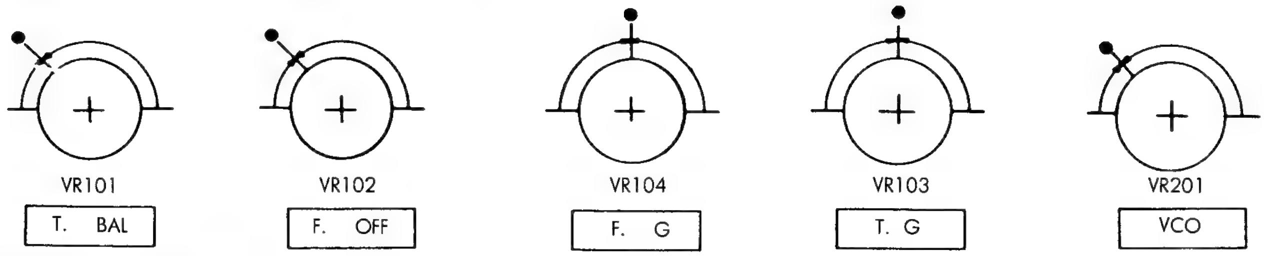
1–7. Focus & tracking gain adjustment



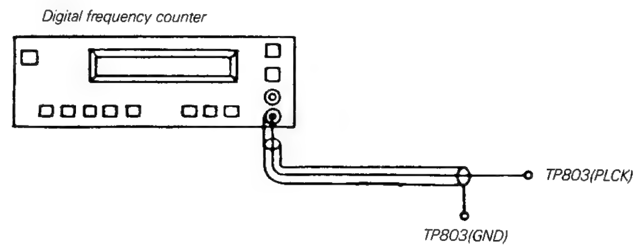
CDP: Adjustment point

2. INITIAL SETTING OF ADJUSTMENT POTENTIOMETERS

Before adjusting, preset adjustment potentiometers like below.

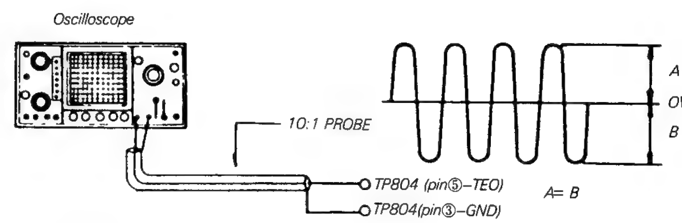


3. PLL (VCO) ADJUSTMENT



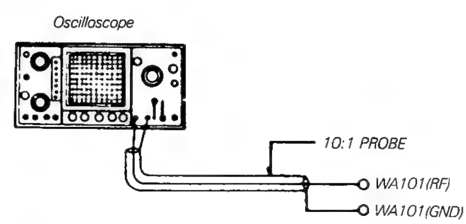
(1) Connect digital frequency counter to WA302(PLCK) and WA302 (GND).
(2) Shortcircuit WA301 (ASY) and WA301 (GND).
(3) Adjust VR201 so that the frequency counter reading becomes 3. 5MHz(±10KHz).

4. E-F BALANCE ADJUSTMENT



(1) Connect the oscilloscope to WA104 (pin⑤-TEO)and WA104 (Pin③-GND).
(2) Place test disc on turntable.
(3) Shortcircuit WA104 (pin ④-TEI) and WA104(pin ③-GND)
(4) Adjust VR101 so that the amplitude above and below the zero DC line becomes equal (ampliutde A=B).
(5) Open circuit WA104 (pin ④-TEI)and WA104 (pin ③-GND)

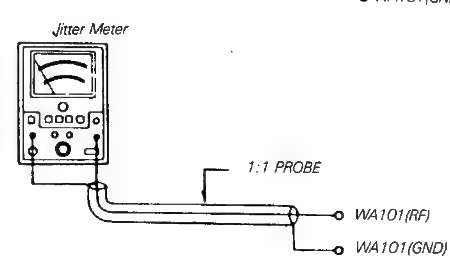
5. FOCUS OFFSET ADJUSTMENT (without jitter meter)



(1) Place test disc on the turntable.
(2) Put unit into play mode.
(3) Connect oscilloscope to WA101 (RF) and wa101(GND).
(4) Adjust VR102 so that eye pattern become clear and waveform (V_{p-p})is maximum.

NOTE: When confirming eye pattern, you have to use 10:1 probe.

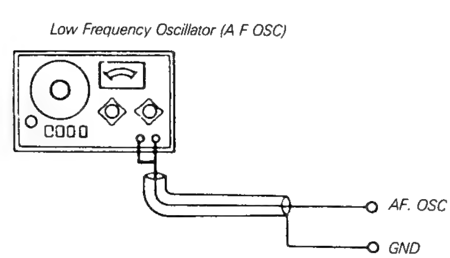
6. FOCUS OFFSET ADJUSTMENT (with jitter meter)



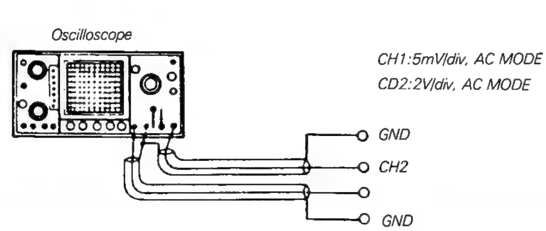
(1) Connect the jitter meter to WA101 (RF) and WA101 (GND), set the input selection switch of jitter meter to position of "×1".
(2) Place test disc on the turntable.
(3) Put unit into play mode.
(4) Adjust VR102 so that the jitter meter reading is minimum.

NOTE: Jitter meter must have input "×"made selection switch.

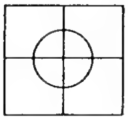
7. FOCUS GAIN ADFUSTMENT (with jig)



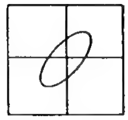
(1) Connect CN804 from gain adjustment jig to WA104 on the main P. C. board pin to pin.
(2) Connect audio frequncy oscillator to A. F. OSC terminal and GND on the gain adjustment jig.
Set the audio frequency oscillator outpqu to 550 Hz, 4 V_{RMS}



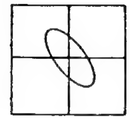
(3) Connect oscilloscope to CH1, CH2, and GND on the main P. C. board.
(4) Insert test disc and put unit into play mode on track.
(5) Set swich SW2 on the gain adjustment jig to the position of "F".
(6) Set switch SW1 on.
(7) Adjust VR104 so that the waveform on the oscilloscope becomes like below.



Good dajustment
(Optimum focus gain)



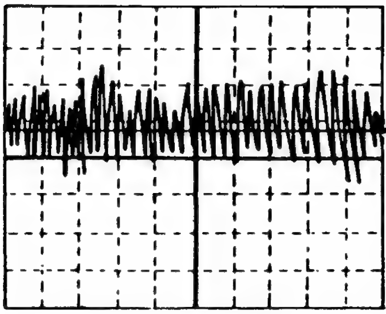
Bad adjustment
(In the case of low focus gain)



Bad adjustment
(In the case of high focus gain)

8. FOCUS GAIN ADJUSTMENT (without jig)

(1) Connect the Oscilloscope to WA104 (pin ②–FEO) and WA104 (pin ⑤–GND)
(2) Insert test disc and put unit into play mode on track.
(3) Adjust VR104 so that the waveform on the oscilloscope becomes like below.



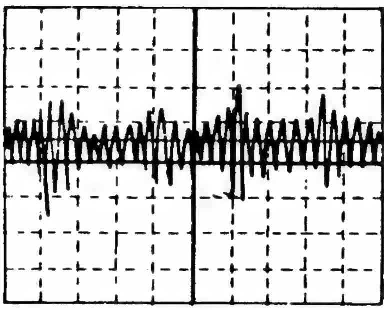
80mV(The DC level of FEO waveform)

OV

100mV/div:Volt/div.
2mS/div: Time/div.

NOTE: According to VR104 setting position, DC level of waveform varies.

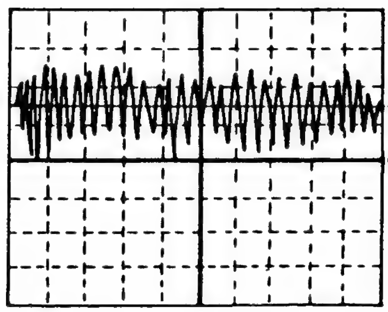
Good adjustment
(Optimum focus gain)



50mV

OV

Bad adjustment
(In the case of high focus gain)



125mV

OV

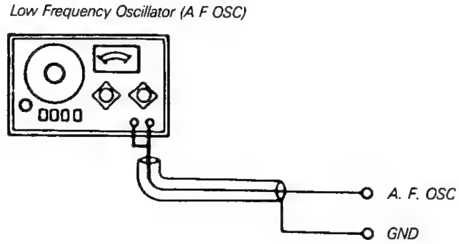
Bad adjustment
(In the case of low focus gain)

(4) This method will be convenient in the field. In spite of simple method, this method will not make serious problems.

9. TRACKING GAIN ADJUSTMENT (with jig)

(1) Connect CN804 from gain adjustment jig to WA104 on the main P. C. board pin to pin.
(2) Connect audio frequency oscillator to A. F. OSC terminal and GND on the gain adjustment jig.
Set the audio frequency oscillator output to 550Hz, 4 V_{RMS}.

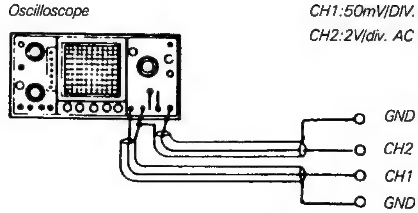
Low Frequency Oscillator (A F OSC)



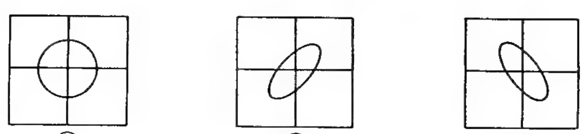
(3) Connect oscilloscope to CH1, CH2 and GND on the main P. C board.
(4) Insert test disc and put unit into play mode on track.
(5) Set switch SW2 on the gain adjustment jig to the position of "T".
(6) Set switch SW1 on.
(7) Adjust VR103 so that the waveform on the oscilloscope becomes like below.

Oscilloscope

CH1:50mV/DIV. AC MODE
CH2:2V/div. AC MODE

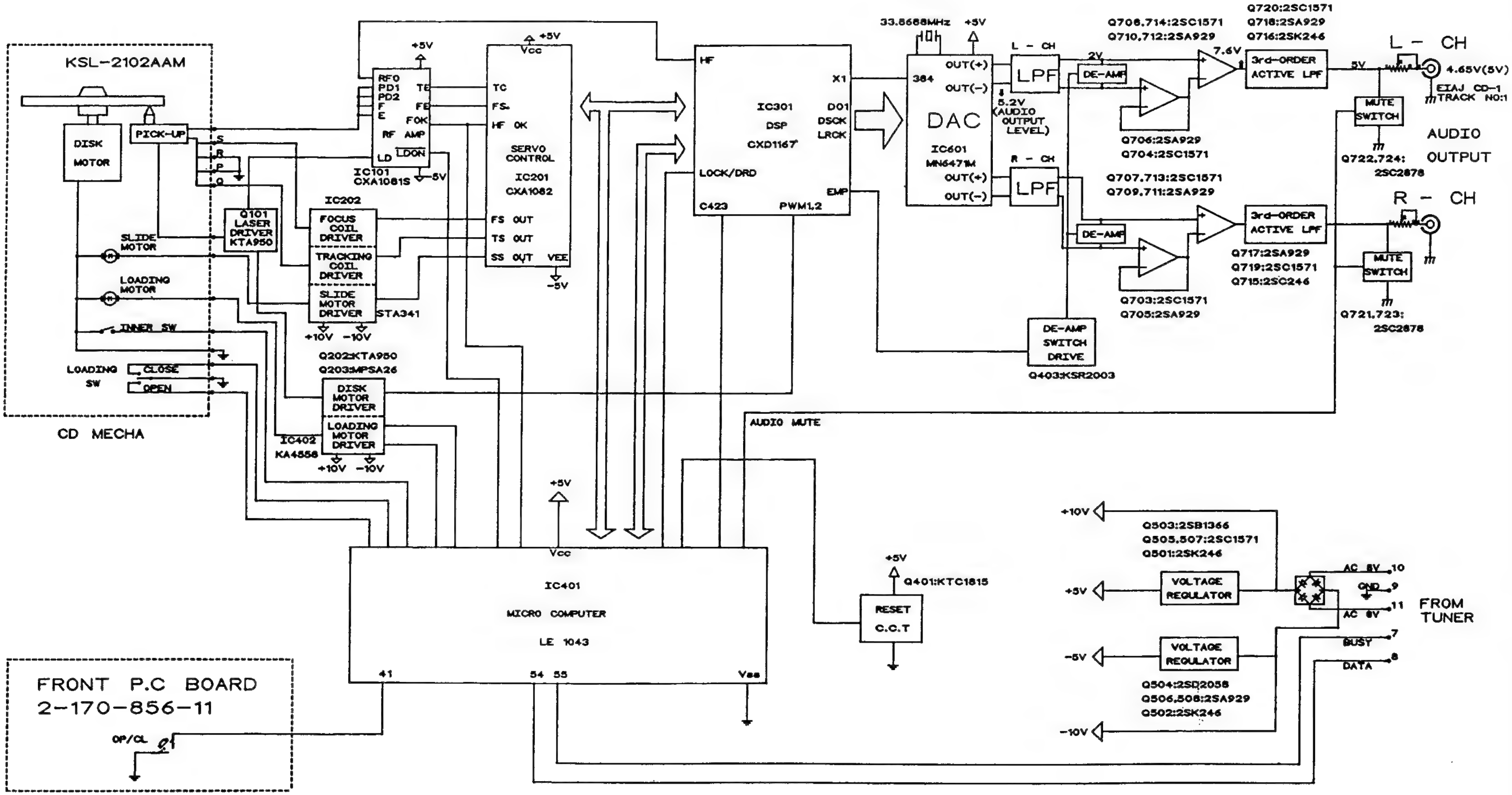


①Good adjustment (Optimum tracking gain)
②Bad adjstment (In the case of low tracking gain)
③Bad adjustment (In the case of high tracking gain)



① ② ③

CD-300/500 CDP BLOCK DIAGRAM



CIRCUIT DESCRIPTION

-CDP-

1. APC CIRCUIT

A semiconductor laser is used as the light source for the optical pick-up. As the output from the semiconductor laser changes radically with changes in temperature, a circuit must be provided to stabilize this output. For this purpose, a monitor diode which detects the optical output of the laser diode is used in the semiconductor laser.

As the laser diode emits light from its bonded surface, light is emitted both in front and behind. The light emitted behind is monitored with the monitor diode installed on its rear surface, and the optical output is thus controlled. The light emitted in front becomes the light source for the pickup.

Fig. 1 shows the APC circuit.

When the temperature rises and the optical output decreases, the monitor diode current (IS) decreases, the electric potential of IC101 pin 5 rises, the base current of the driving transistor increases, and the laser diode current increases. This causes the reduced optical output to return to its former level.

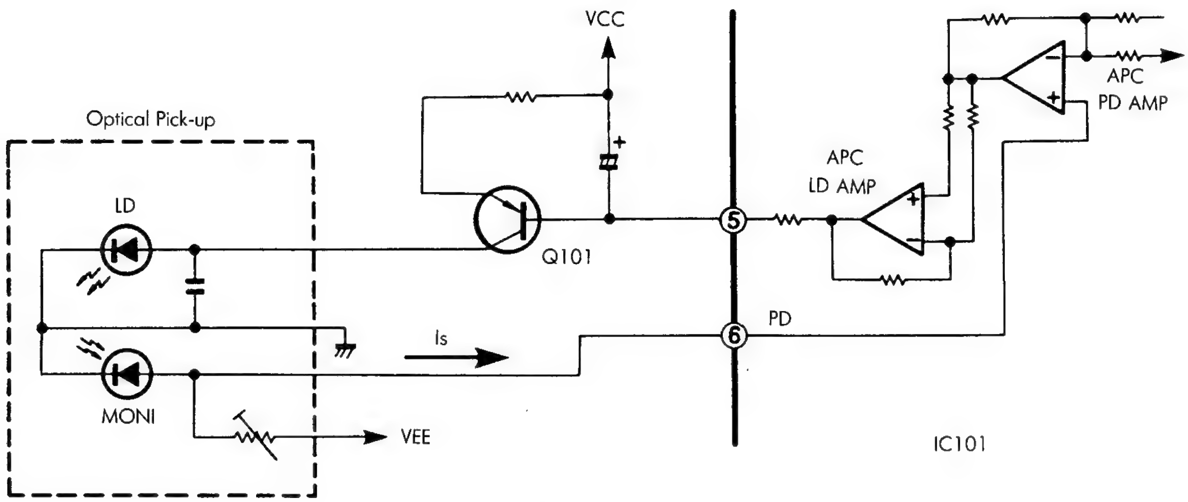


Fig. I

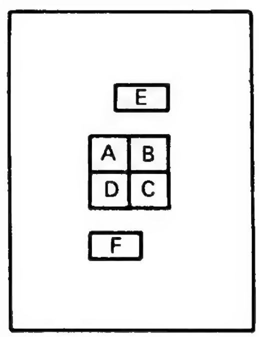
2. FOCUS SERVO

2–1. Optical pickup

This set employs a three-beam optical pickup comprised of six division photodiodes, A through F as shown in Fig. 2. The four photodiodes (A through D) at the center provide focus error detection by using their property to allow the beam to focus into a round image only at a certain point.

The sums of outputs from diagonal two elements of four division photodiodes (A+C and B+D)are compared by the differential amplifier in IC101 to detect the shape of the beam image.

The remaining two diodes (E and F) provide tracking error detection by means of sub-beam spots.



Three spotted (six-division) photo diodes

Fig. 2

2–2. Focus error detecting operation

The reflected laser beam from a disc is polarized 90° with the beam-splitter and sent to the cylindrical lens. The beam passed through this cylindrical lens is then sent to the four division photodiodes and focuses into an image whose shape varies with the distance between the disc and the objective lens. Such change in the beam shape causes the current flowing from the photodiodes to vary.

Shown in Fig. 3 is the Principle of the focus error detection.

The currents from the photodiodes (A+C and B+D) are applied to pins 7 and 8 of IC101 and converted to voltage by RF I–V amplifiers (1) and (2) included in IC101.

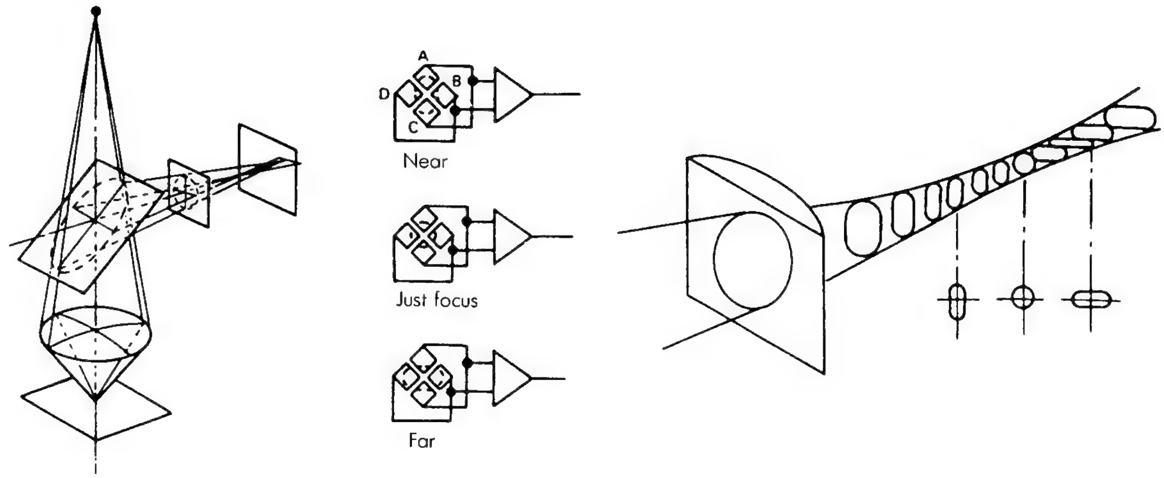


Fig. 3

2–3. Focus servo servo control operation

The focus error signal, after begin converted to voltage by the RF I–V amplifier, is transmitted to the operation amplifier in the IC and output from pin 19.

When the disc to objective lens distance is in just focus, the beam forms a true round. In this state, the beams applied to four elements of four division photodiodes become equal and thus the output provided then is O (zero). When the disc to objective lens distance is too close (near focus), the beam is reflected divergently to form an oval in crosswise direction. In this state, the outputs provided from photodiodes A and C are higher than those from B and D, resulting in negative (–) output voltage. On the other hand, when the distance is too far (far focus), the beam is reflectd convergently to form an oval in longitudinal direction. Then the outputs from photodiodes B and D are higher, resulting in positve (+) output.

The output voltage(focus error signal)from pin 19 of IC101 passes through IC201, in from pin 48 and out from pin 5, and IC202, in from pin 4 out from pin 6 as shown in Fig. 4. It is amplified in each IC and fed to the focus coil which then drives the objective lens of the pickup.

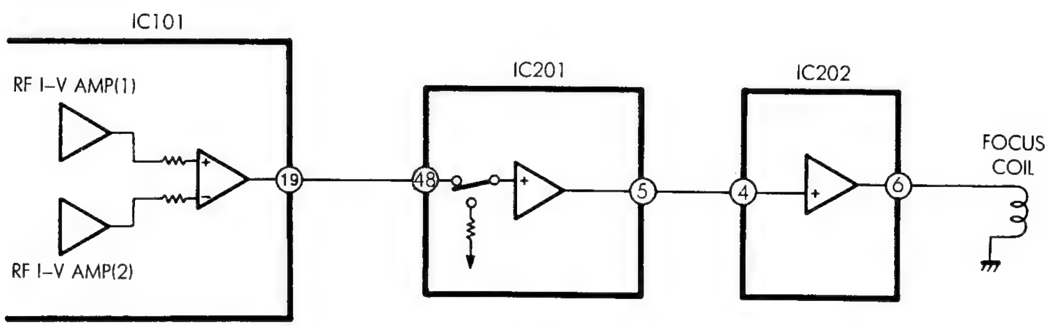


Fig. 4

2.4 Tracking error detection system

Fig. 5 shows the principle of the tracking error detection system which employs the three beam system.

The laser beam is divided into the main beam and two sub-beams by diffraction grating and they are arranged on one line. The center line connecting these three beams has a slight offset angle against the main beam. The main beam is received by photodiodes A, B, C and D and two sub-beams by E and F respectively.

Fig. 5–A shows the on-track state. As both auxiliary beams 1 and 2 are slightly on the track in this state, the outputs of photodiodes E and F are equal and the tracking signal is 0(zero). When the track is shifted to the left (Fig. 5-B), the auxiliary beam 1 is off the pit. This allows more light to be received by the photodiode E, resulting in positive (+)tracking signal output. On the other hand, when the track is shifted to the right (Fig. 5–C), the amount of light received by the photodiode F increases, resulting in negative(–) tracking signal output. And these extreme signals are detected as tracking error signals.

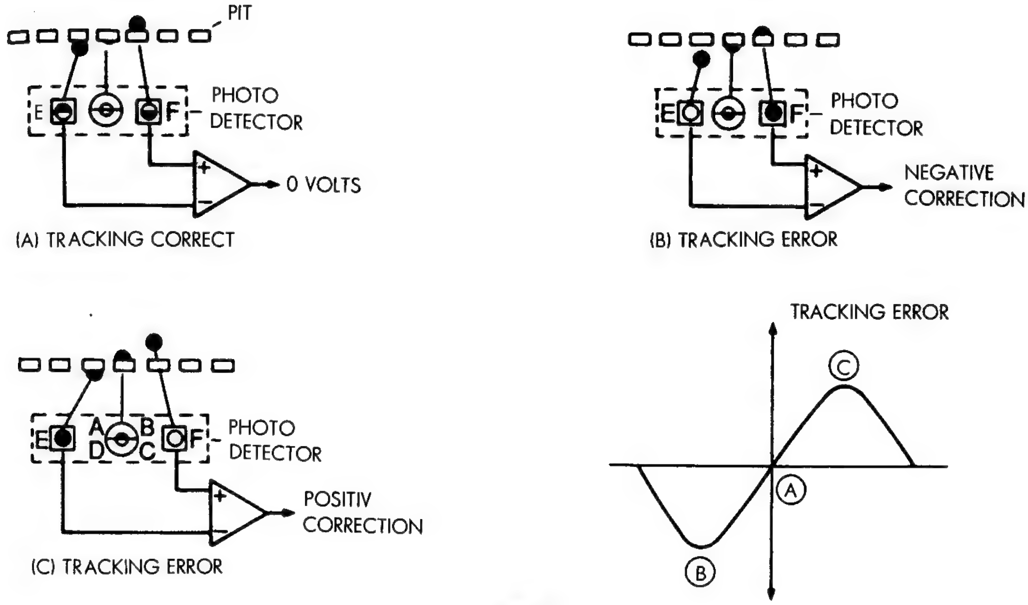


Fig. 5

2–5. Tracking servo control operation

When a tracking error signal is detected by photodiodes E and F, it is fed to pins 11 and 10 of IC101 respectively as shown in Fig. 6. In IC101, the signal is converted into voltage by the E I–V amplifier and F I–V amplifier, transmitted to the tracking error amplifier and output through pin 20. While it passes through IC201, in from pin 45 and out from pin 11, and IC202, in from pin 3 and out from 7, it is amplified in each IC and sent to the tracking coil to adjust pickup so that the amount of track shift is reduced as closely to none as possible.

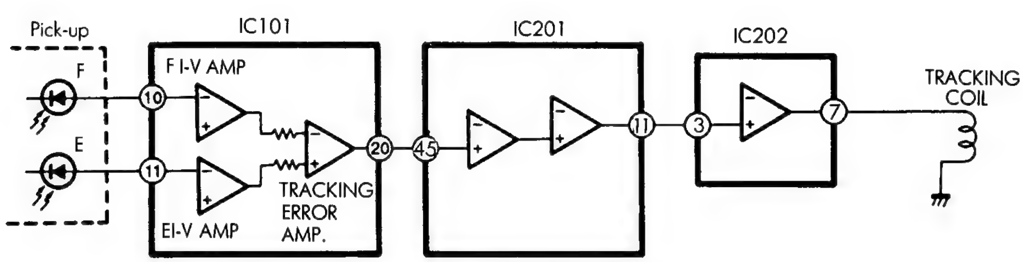


Fig. 6

3. Regenerative Circuit

3–1 RF circuit

The currents from photodiodes (a, b, c and d)are fed to IC101 through pins 7 and 8 and converted to voltage by RF I–V amplifiers (1) and (2) respectively there, added by the RF summing amplifier and output from pin 2 as a signal. As it is sent to pin 5 of IC301, it can be checked at the test point (WA101) provided on its way by means of the eye pattern check.

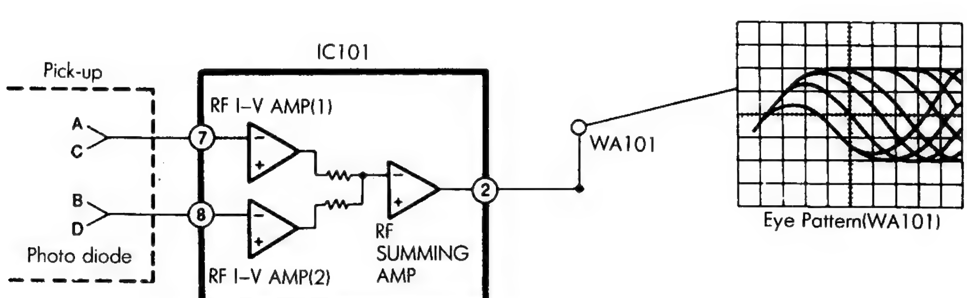


Fig. 7

3–2. EFM demodulation, error correction, serial/parallel conversion

EFM demodulation, error correction and serial/parallel conversion are performed by the internal circuitry of IC301. The eye–pattern signals from pin 27 of IC101 are sent to pin 5 of IC301, then demodulated from 14 bits to 8 bits by EFM readjustment. At the same time any error, if found, is corrected (CIRC) and the signals are sent to the D/A converter interface. After that, they are output as 18–bit digital signals from pins 76, 78 and 80 of IC301 and fed to the D/A converter of IC601.

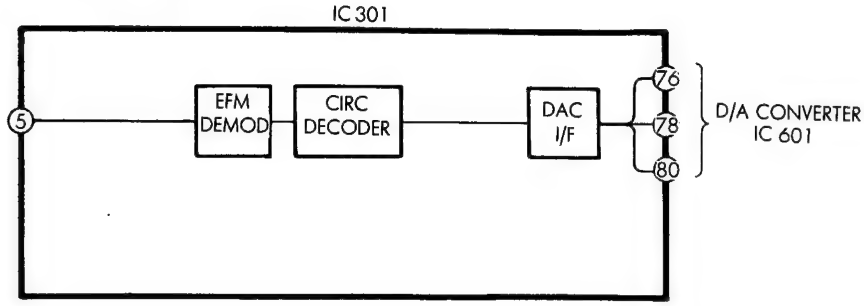


Fig. 8

4. 1–bit D/A Converter

Conventionally, high–precision D/A conversion was mainly carried out using resistor ladder systems. There was, however, one main drawback with these systems, which was that zero cross distortion was likely to be generated. To achieve production of a high-precision D/A converter with a minimum amount of zero cross distortion, it would be necessary to carry out complicated and bothersome processes such as laser trimming processing. In addition, use of such D/A converter would require a sampling-and-hold circuits(or deglitcher circuit) and an intricate analog filter with special characteristics When mounting it.

To solve these difficulties, we used a 1–bit D/A converter with 3rd order noise
shaping technology(IC601 : MIN 6471M)

4–1. Features and Configuration of MN6471M

Features
1. No zero cross distortion
2. No non linear distortion
3. Built-in 4 times oversampling digital filter
4. 2 channels (left and right) built in
5. 4DAC configuration possible
6. Single 5V power supply operation

The block diagram is shown in Fig. 9. The MN6471M is configured of a digital filter, a 3rd order noise shaping circuit, and a PWM.

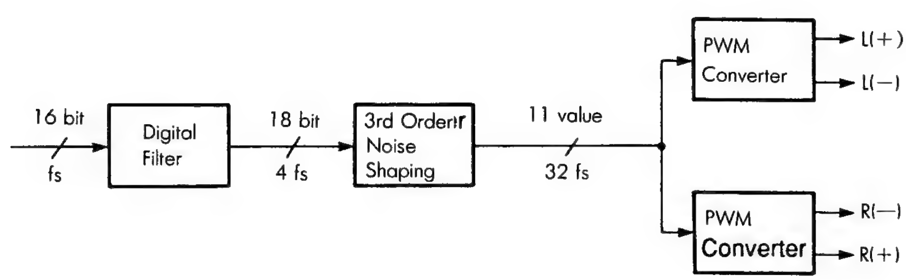


Fig. 9

4–2. Configuration of MN6471M

Fig. 10 shows the configuration of the MN6471M. The sampling frequency of the input data is expressed in fs, so the 3rd order noise shaping circuit operates at 32fs. This means that a 32–times oversampling filter is required. In this LSI, however, oversampling is carried out first at 4fs in the first digital filter, and following that, a O order hold takes place in the 3rd order noise shaping circuit. This enables conversion of the 4fs signal to a 32fs signal.

The digital filter, using 384fs as clock signals, and the noise shaping section, uses 64fs, carry out time division processing on the data for the left and right channels. The PWM section, using 768fs as a clock signal, carries out signal processing for the left and right channels independently.

In the noise shaping section, the 19-bit 32fs signal is converted to 11 values and pulse width modulation (PWM) in carried out on these signals in the PWM section. D/A conversion is carried out in this way. Following are the descriptions of the various blocks.

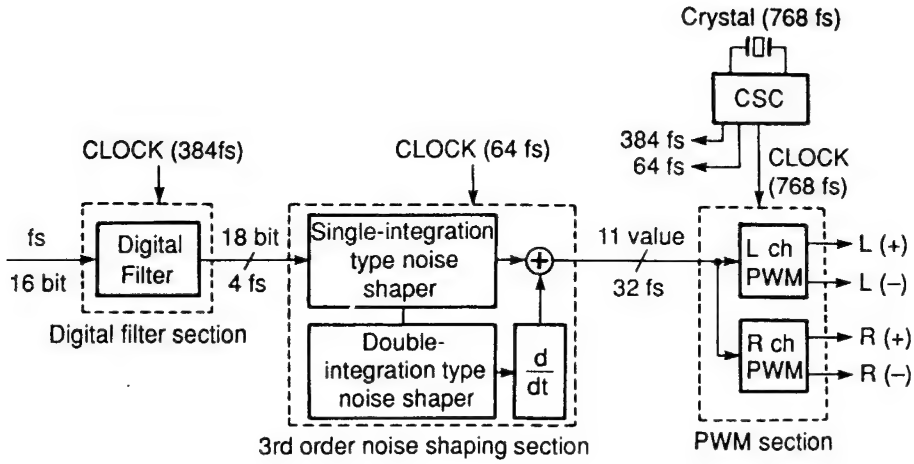


Fig. 10

5. Digital filter

Fig. 11 shows the signal data of an audio signal up to 20 kHz that has been digitalized, along with the frequency distribution of the signal data. The graphs show the conditions for a sampling frequency of 44. 1 kHz, plus its doubled frequency, 88.2 kHz, and its quadrupled frequency, 176.4 kHz.

As the figure shows, for the same signal up to 20 kHz, the noise portion of the digitalized signal component tends to shift toward the higher range of the signal if the sampling frequency is increased. However, at any sampling frequency, the volume of necessary audio signal information remains constant up to 20 kHz. This allows certain important results to be derived; that is, if the information represented in section (a) is obtained, then it should be possible to create a signal in the form shown in(b) or (c).

When the noise caused by sampling shifts to the higher frequency range, as shown in (b) or (C), the low pass filter characteristic to eliminate noise during re-conversion to an audio signal need not be steep but can be rather gradual as shown. It is comparatively simple to provide a high audio quality low pass filter of such characteristic with little phase fluctuation or distortion.

The question now becomes how to make a signal sampled at 44. 1 kHz resemble one sampled at a much higher frequency. Fig. 12 shows the signal sequence sampled at the same 44.1 kHz as in Fig. 11 and its frequency distuibrtion.

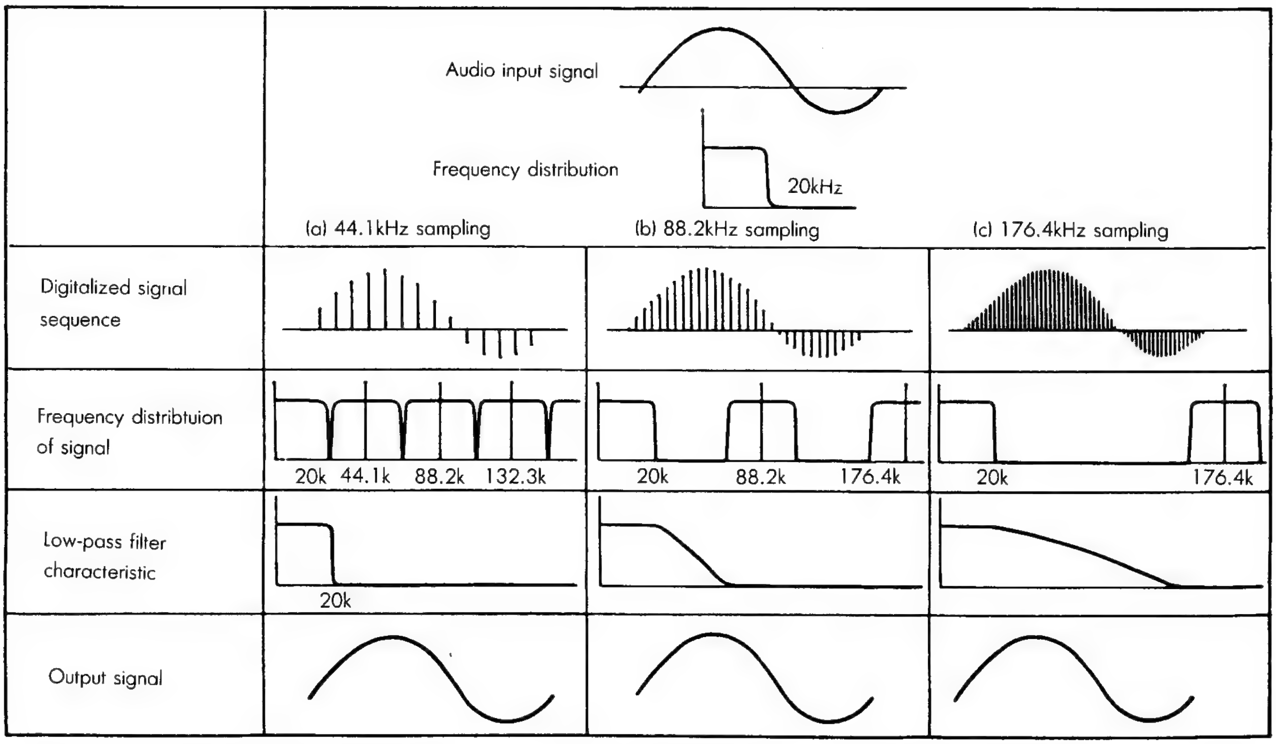


Fig. 11

If the frequency is to be doubled as the first step in increasing the sampling frequency of the signal, zero-level data is added between the data marked with X in Fig. 12(b). In the original signal sequence sampled at 44.1 kHz, there are data only at the points of the sampling timing, while the intervals between those points have all been made zero-level. Introducing zero data in these intervals does not change the original data in any way, nor is the frequency distribution altered. Only the sampling frequency is double.

Passing this data in its modified form through a digital filter with the characteristic shown in Fig. 12(c) causes the portion corresponding to N1 to be eliminated, resulting in a signal sequence with the frequency distribution shown in (d). This signal sequence possesses exactly the same shape as that obtained for the signal in Fig. 11(b), sampled at 88. 2 kHz. In other words, this method enables the sampling frequency to be doubled.

The digital filter used in this unit is a Finite Inpulse Response type. Its circuit diagram is shown in Fig. 13.

The sampling frequency of this unit has been quadrupled, and the phase characteristic has been improved by using a softer analog low-pass filter.

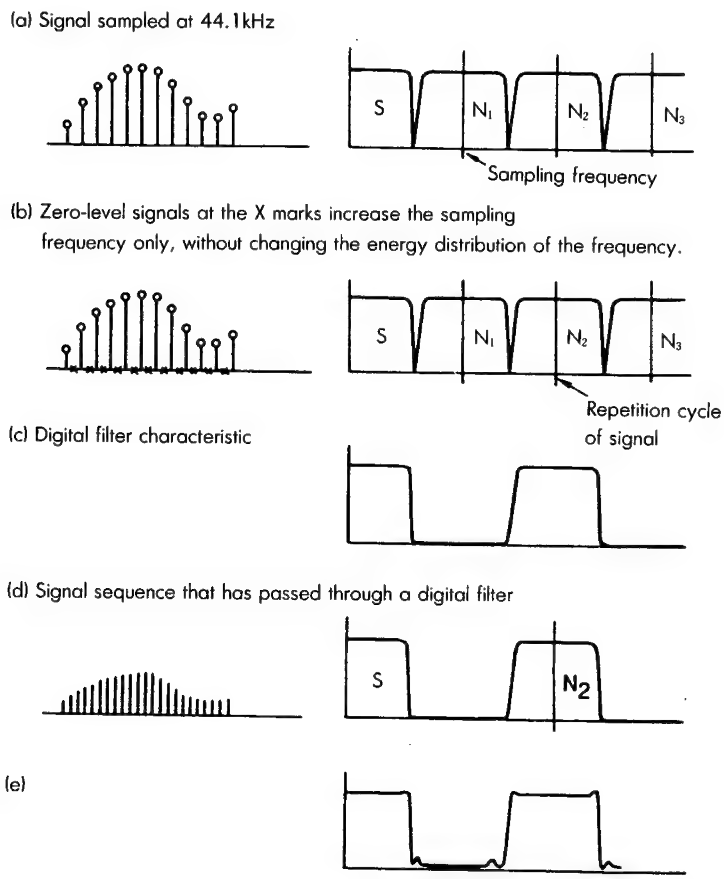


Fig. 12

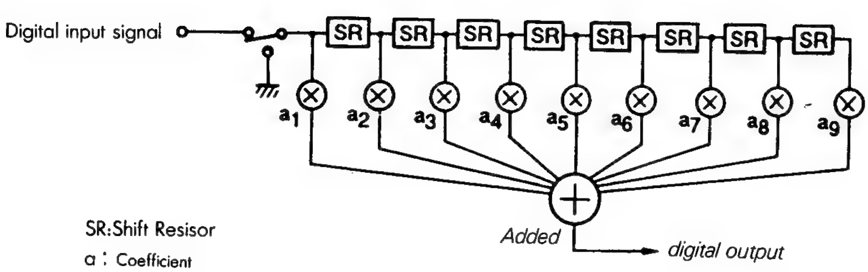


Fig. 13

6. Noise shaper

a) Single-integration noise shaper

The block diagram is shown in Fig. 14.

According to the figure, the relation between input X and output Y is as follows:

$Y=X+(1-Z^{-1})Vq\cdots\cdots(1)$

The quantization error Vq is a random value, and $(1-Z^{-1})$expresses the differential characteristic. Thus, according to equation (1), the spectrum of the quantization error Vq for the single-integration noise shaper has a characteristic of 6dB/oct, and the lower the frequency is, the greater the attenuation becomes, (This is because the noise distribution can be changed by the noise shaper).

b) Double–integration noise shaper

The block diagram is shown in Fig. 15.

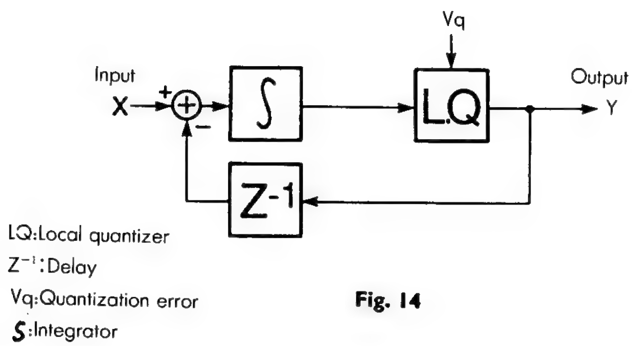


Fig. 14

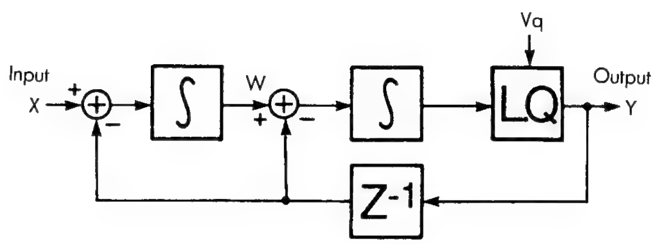


Fig. 15

In Fig.15, the path to the output seen from W has a configulation identical to that of the single-integration noise shaper, so that relation between W and Y is:

$Y=W+(1-Z^{-1})Vq\cdots\cdots(2)$

The relation between X and Y is:

$W=\frac{1}{1-Z^{-1}}(X-Z^{-1}Y)\cdots\cdots(3)$

And the result obtained from above equations (2) and (3) is:

$Y=X+(1-Z^{-1})^{2}Vq\cdots\cdots(4)$

Comparison with equation (1) shows that the term $(1-Z^{-1})$ is a square of itself. In other words, with the double-integration nosie shaper, the spectrum of the quantization error Vq is attenuated at a slope of 12dB/oct.

Fig. 16 shows the output spectrum of the noise shaper.

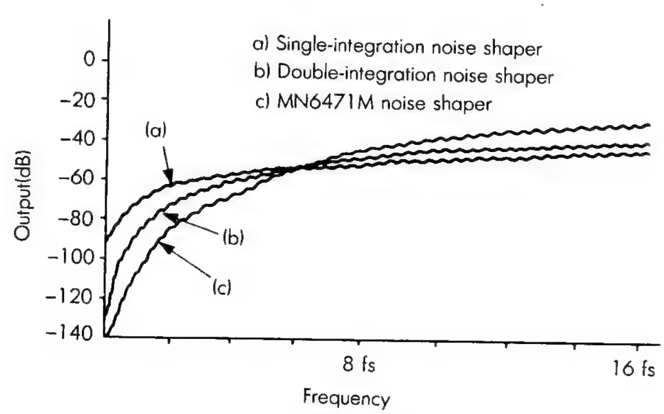


Fig. 16

6–2. 3rd order noise shaper

The black diagram of the 3rd order noise shaper is shown in Fig. 17.

This configuration shows that the first stage uses a single-integration noise shaper and the following stage uses a double-integration noise shaper. The quantization error of the first stage is input at the second stage.

In this configuration, siugle-integration and double-integration noise shapers are connected at several stages, and the quantization error of the provious state is quantified again at the following stage, so that the quantization error included in the output of the previous stage is negated. In this way, compensation is carried out.

In this noise shaping circuit, the input is expressed as X, the output as Y, and the re-quantized error as Vq, and their relation for each order is shown in the following equations.

(1st order) $Y=X+(1-Z^{-1})Vq$

(2nd order) $Y=X+(1-Z^{-1})^{2}Vq$

(3rd order) $Y=X+(1-Z^{-1})^{3}Vq$

In noise shaping, as the order of the transfer coefficient called$(1-Z^{-1})$becomes larger, the noise in the 1/2 fs audio band moves higher in the frequency range. The result is that, within a narrow audio band, an 18-bit performance can be obtained even from a 1-bit DAC

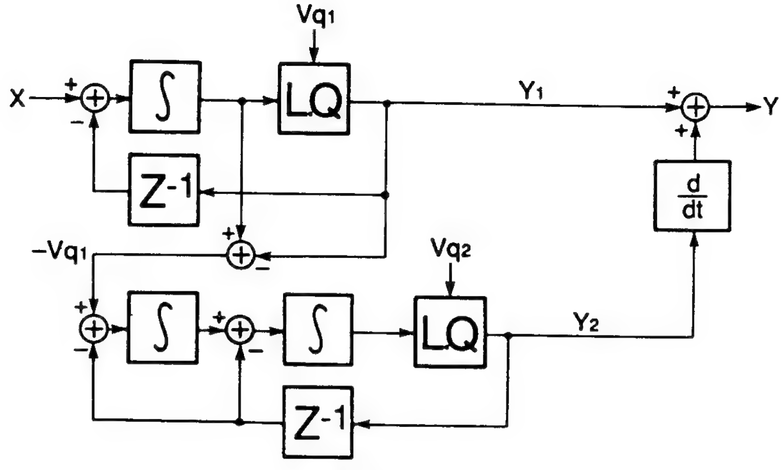


Fig. 17

$$Y_1 = X + (1 - Z^{-1})\, Vq_1 \quad \cdots\cdots (5)$$

$$Y_2 = Vq' + (1 - Z^{-1})^2\, Vq_2 \quad \cdots\cdots (6)$$

$$Y = Y_1 + (1 - Z^{-1})\, Y_2 \quad \cdots\cdots (7)$$

The result obtained from above equations (5)–(7) is:

$$Y = X + (1 - Z^{-1})^3\, Vq^2 \quad \cdots\cdots (8)$$

7. PWM Output Section

In the output from the MN6471M noise shaper, the 11 value data of the 32fs is output. In the PWM section, pulse width modulation (PWM)is carried out on that signal, enabling D/A conversion.
Fig. 18 shows the PWM section of the MN6471M.

The 11 value digital data output from the noise shaper is converted (1-bit data stream) to pulse signal With11 pulse widths precisely controlled by the crystal OSC and output as an analog signal. In the PWM output section, signals from both left and right channels are output as differential output so that the synchronous-phase noise is eliminated and the 2nd order high-frequency distortion is reduced.

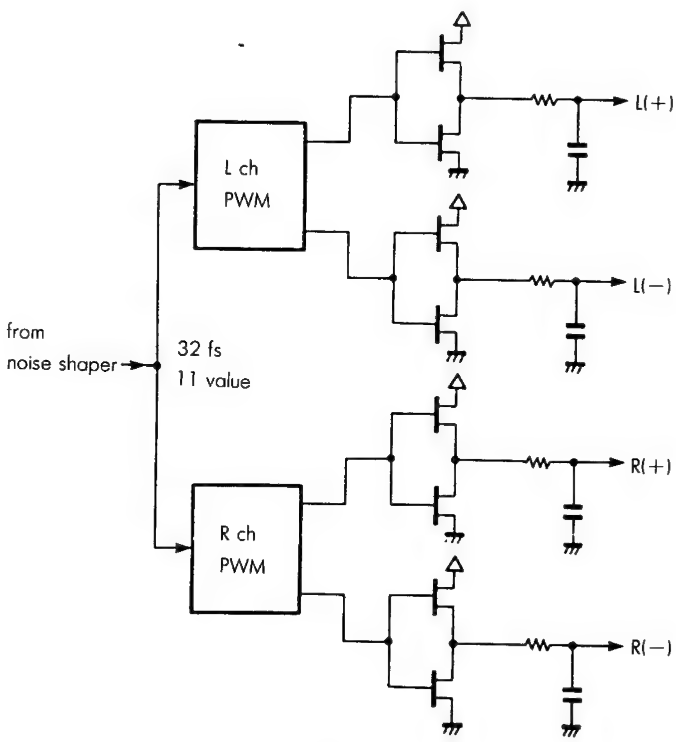


Fig. 18

8. Audio Circuit

Fig. 19 shows a block diagram of the audio circuit.

The outputs from Pin 14(OUT L(+)) and Pin 11 OUT (–) pass through the 2–step LPF which consists of C702, R704 and R702 for one and C704 and R 706 for the other, and the high frequency component of the PWM output from DAC is removed.

Then the (+) side component of the PWM is inputted directly, and its (–) side componenty through the inverted darligton buffer circuit consisting of Q704 and Q706 to the discrete circuit amplifier cocsisting of Q708, Q710, Q712 and Q714, where they are synthesized into an approximately 2V signal voltage which is then output to the LPF circuit of the next stage.

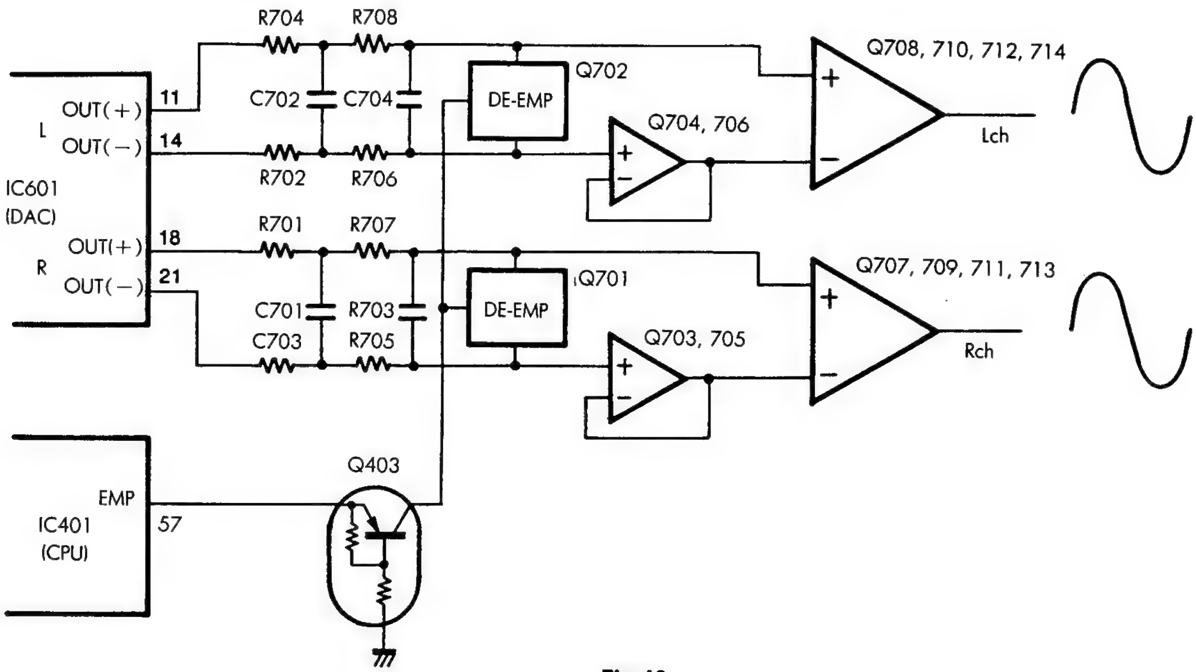


Fig. 19

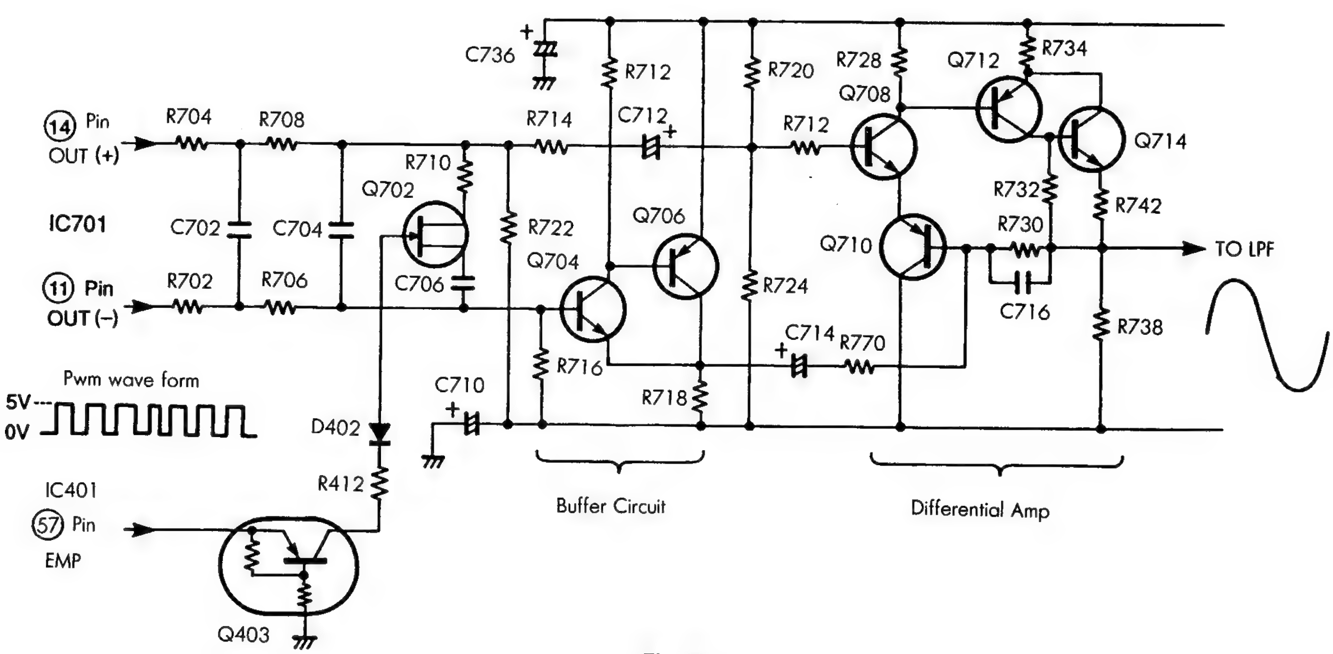


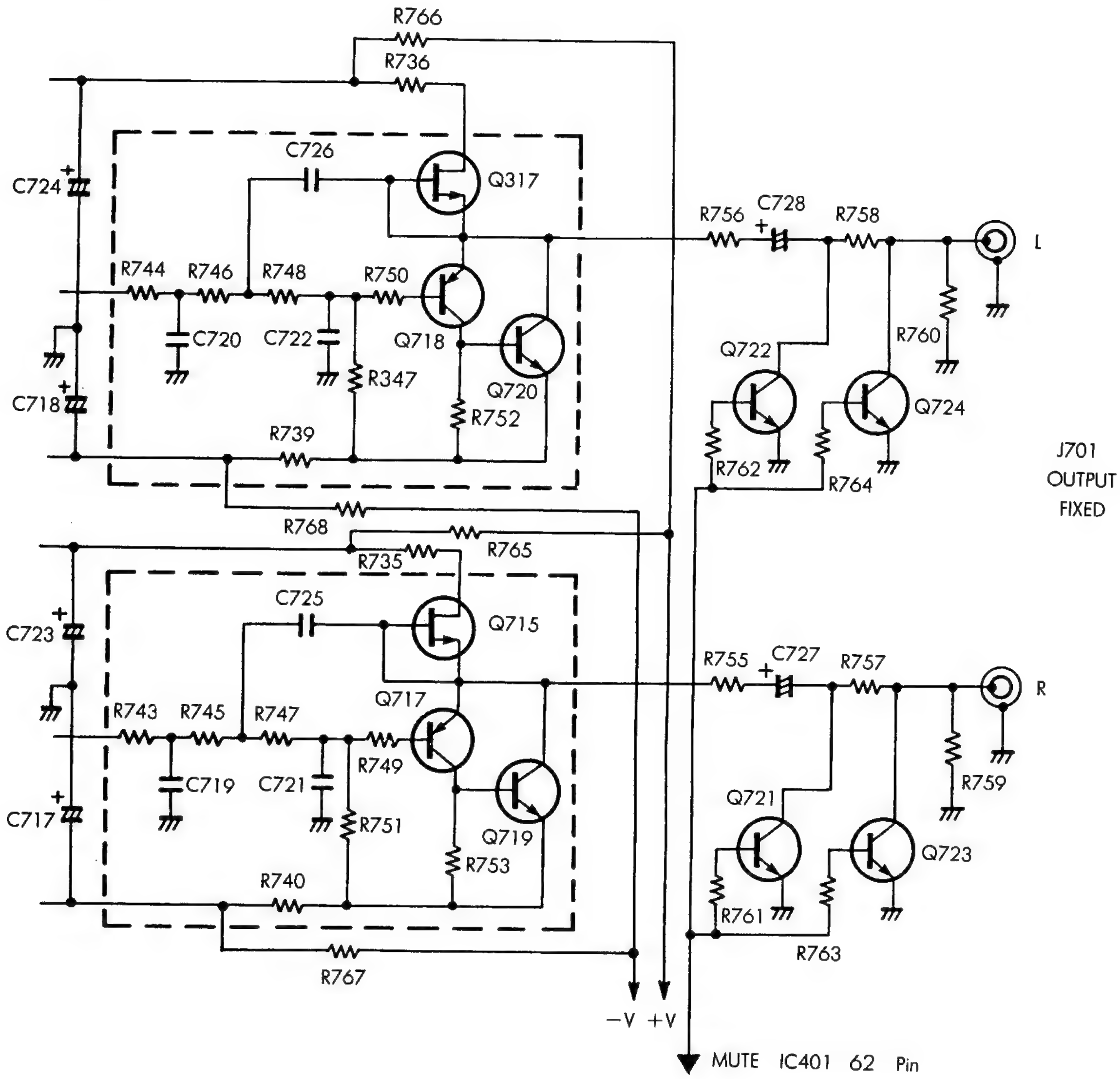
Fig. 20

The emphasis data from the disc is output through the terminal (Pin 57) of IC401. When a disc to which emphasis is applied is played back, this terminal is set high and Q403 turns ON. Following this. Q702 are also turned ON. Then connected C706 and R710 provides the DE-Emphasis characteristics. Fig. 20 shows the buffer circuit and the differential amplifier. (Right channel only)

9. Low-Pass filter

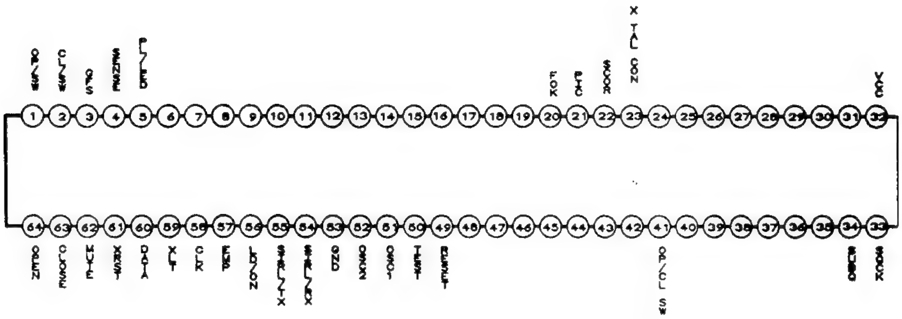
Fig. 21 shows a final-stage circuit which includes a low-pass filter and other elements.

The portion of Fig. 21 enclosed by the broken line is 3rd -other active LPF. This LPF causes noise in the high range to be cut. Q718 and Q720 (Left channel) and Q717 and Q719 (Right channel) are buffer circuit of inverted darlington configuration. Q716 and Q715 are FET controlled constant current circuits. Q725, Q726, Q722, Q721, Q723 and Q724 are power muting circuit.

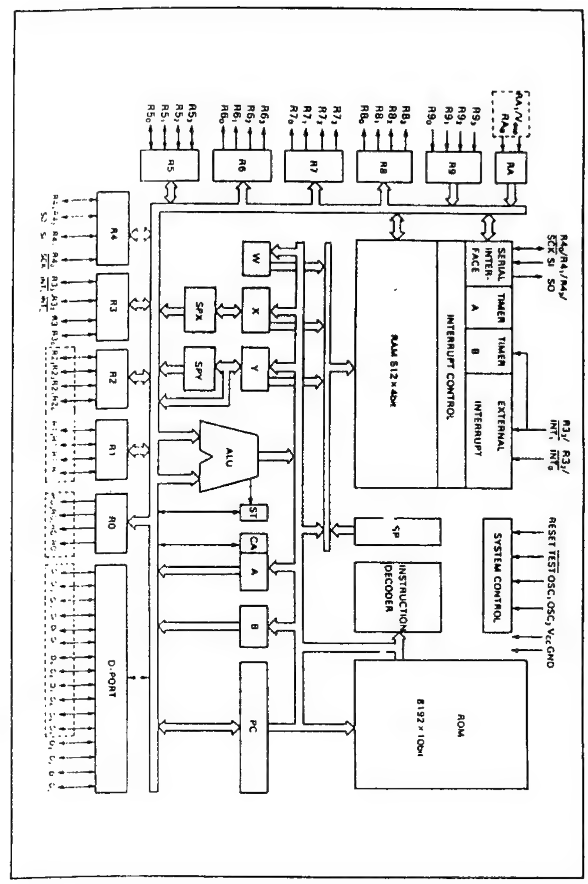


IC FUNCTIONAL BLOCK DIAGRAM

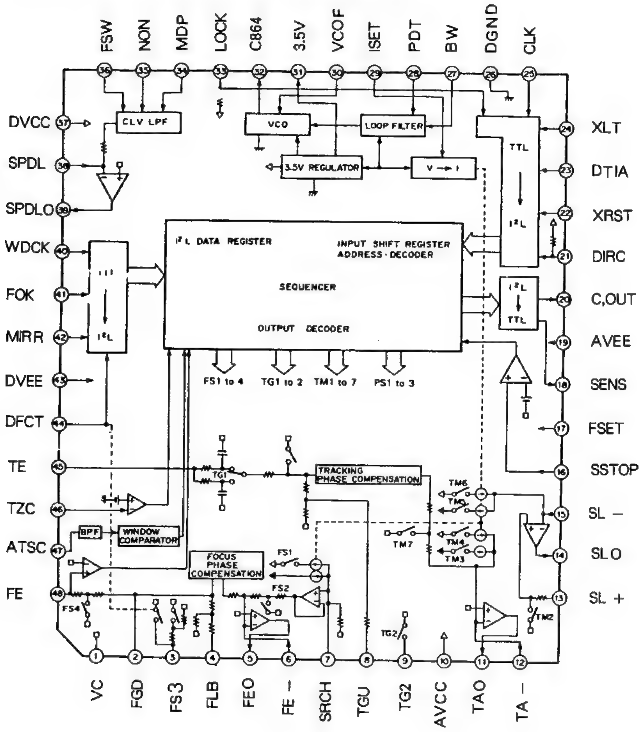
IC 401: MICRO COMPUTER LE1043(HMCS 408 AC)



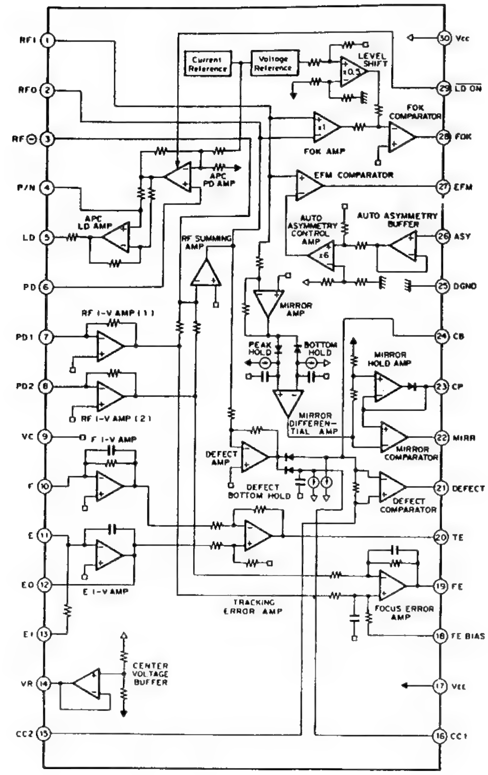
LE 1043 TERMINAL	NO	INPUT/ OUTPUT	FUNCTION DESCRIPTION
OP/SW	1	INPUT	SWITCH INPUT INDICATING THAT TRAY IS OPEN"CON ACTIVE"
CL/SW	2	INPUT	SWITCH INPUT INDICATING THAT TRAY IS CLOSE"CON ACTIVE"
GFS	3	INPUT	IMPORT TERMINAL FOR REVOLUTION SYNCHRONOUS SIGNAL.
SENSE	4	INPUT	DETECTING SIGNAL FORSERVO MODE.
PL/LED	5	OUTPUT	CONTROL OUTPUT FOR ON/OFF OF PLAY LED
N.C	6-19		UNUSED.
FOK	20	INPUT	INPUT TERMINNAL FOR FOCUS SYNCHRONOUS SIGNAL.
PIC	21	INPUT	PIN FOR DETECTING A SIGNL FOR THE ON/OFF LIMIT SWITCH OF THE PICK-UP.
SCOR	22	INPUT	SYNCHRONOUS SIGNAL INPUT OF SUB-CODE.
N.C	23		UNUSED.
X-TAL CON	24	OUTPUT	CONTROL OUTPUT FOR ON/OFF OF X-TAL(33. 86MHz)
N.C	25-31		UNUSED.
VCC	32		POWER SUPPLY DC+5V.
SQCK	33	IN/OUTPUT	CLOCK FOR READING SUB-CODE
SUBQ	34	INPUT	IMPORT TERMINAL FOR SUB-CODE DATA.
N.C	35-40		UNSED.
OP/CL SW	41	INPUT	OPEN/CLOSE KEY INPUT TERMINAL.
N.C	42-48		UNUSED.
RESET	49	INPUT	C.P.U RESET INPUT.
TEST	50	INPUT	UNUSED, CONNECT TO VCC.
OSCI	51	INPUT	SYSYEM CLOCK OSCILLATOR.FCLK=3.0MHz
OSC2	52	OUTPUT	
GND	53	INPUT	GROUNDING TERMINAL.
SIRL/RX/TX	54	IN/OUTPUT	CONTROL SIGNAL IN/OUTPUT OF SYSTEM.
BUSY	55	IN/OUTPUT	
LD/ON	56	OUTPUT	CONTROL OUTPUT FOR ON/OFF LASERDIODE."LOW ACTIVE"
EMP	57	OUTPUT	EMPHASSIS DETECT.
CLK	58	OUTPUT	OUTPUT TERMINAL OF SIGNAL TRANSFER CLOCK FOR SERVO CONTROL SIGNAL.
XLT	59	OUTPUT	OUTPUT TERMINAL OF LATCH FOR SERVO SYNCHRONOUS SIGNAL.



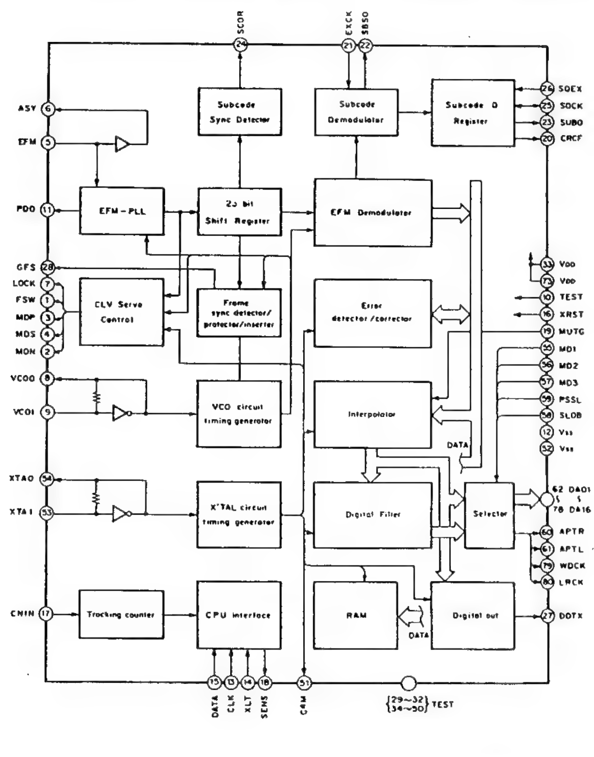
IC 201: CXA 1082 BQ OPTICAL PICK-UP SERVO CONTROL



IC 101: CXA 1081 S RF AMP

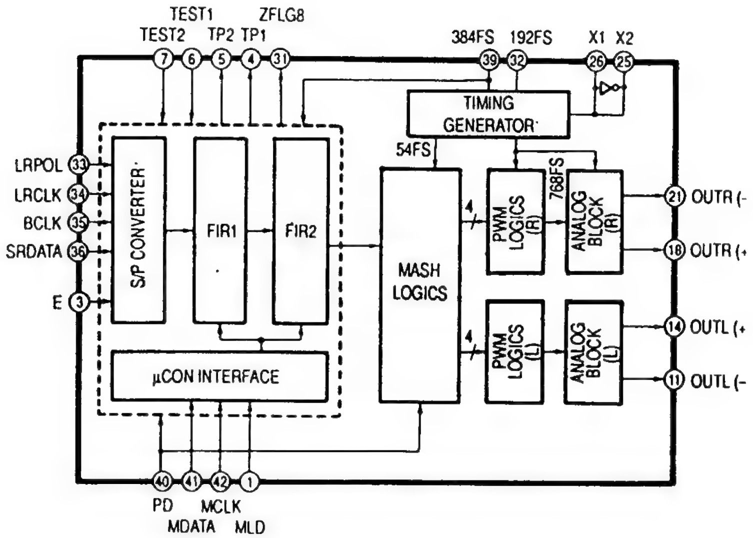


IC 301: CXD 1167Q DIGITAL SIGNAL PROCESSOR AND DYNAMIC RAM

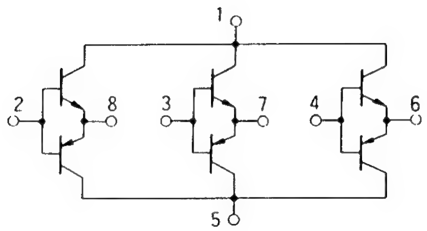


Note) These pins are for the QFP. For VQFP they are different. See Pin Description.

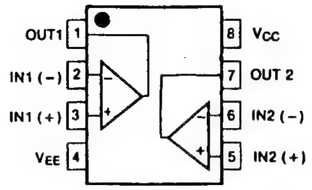
IC 601 : MN 6471 M DIGITAL FILTER & D/A CONVERTER



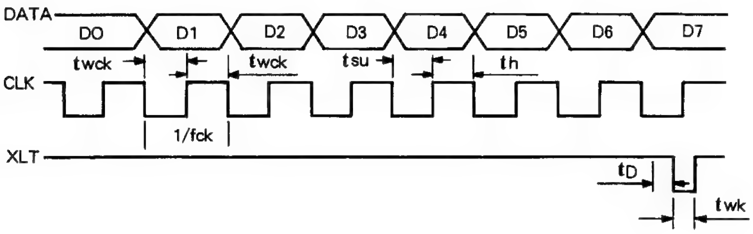
IC 202 : STA 341 M TR ARRAY



IC 402 : MC 4558 C 2-CH OP-AMP



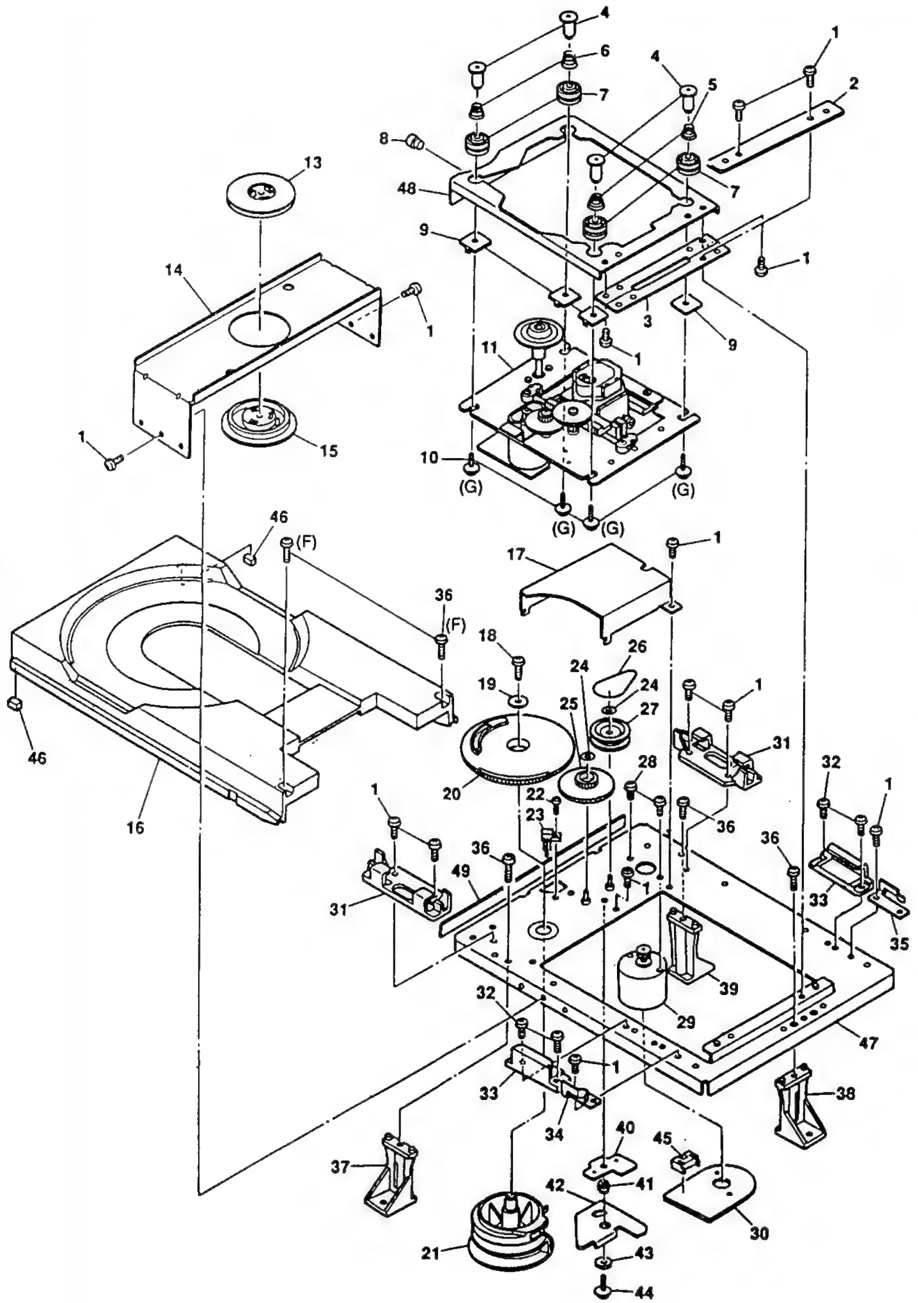
CDP : CD-300/500

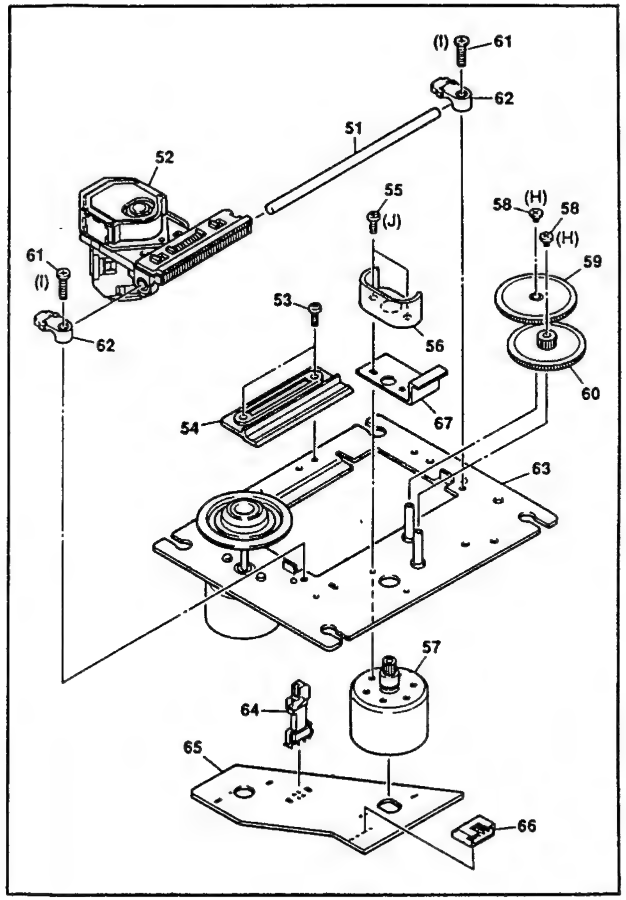


Vcc 5.0 V

Item	Symbol		Unit
Clock frequency	f_{ck}		MHz
Clock pulse width	f_{wck}	500	ns
Hode time	t_{su}	500	ns
Steup time	t_h	500	ns
Delay time	t_D	500	ns
Latch pulse width	t_{WL}	1000	ns

CD MECHANISM EXPLODED VIEW



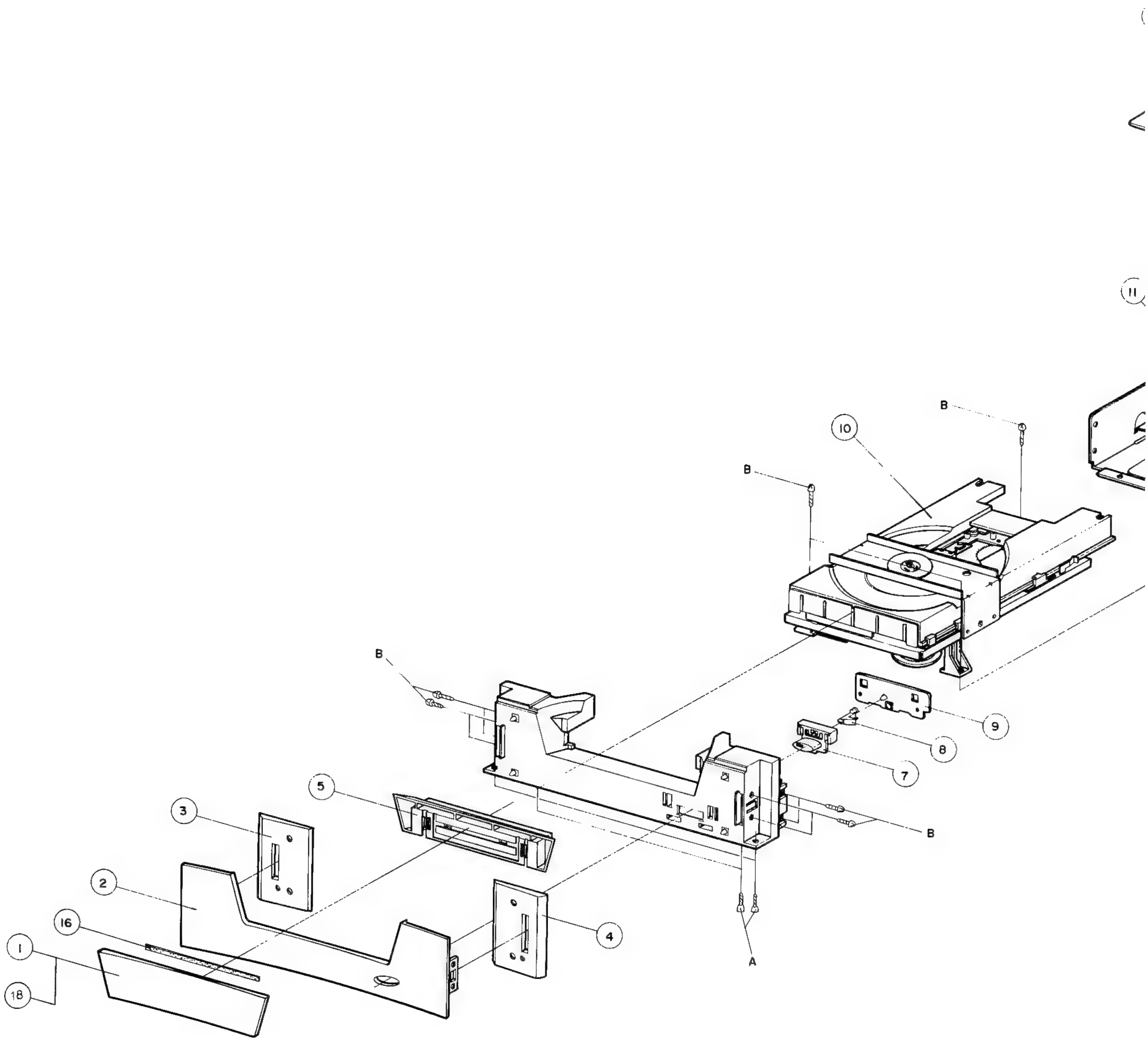


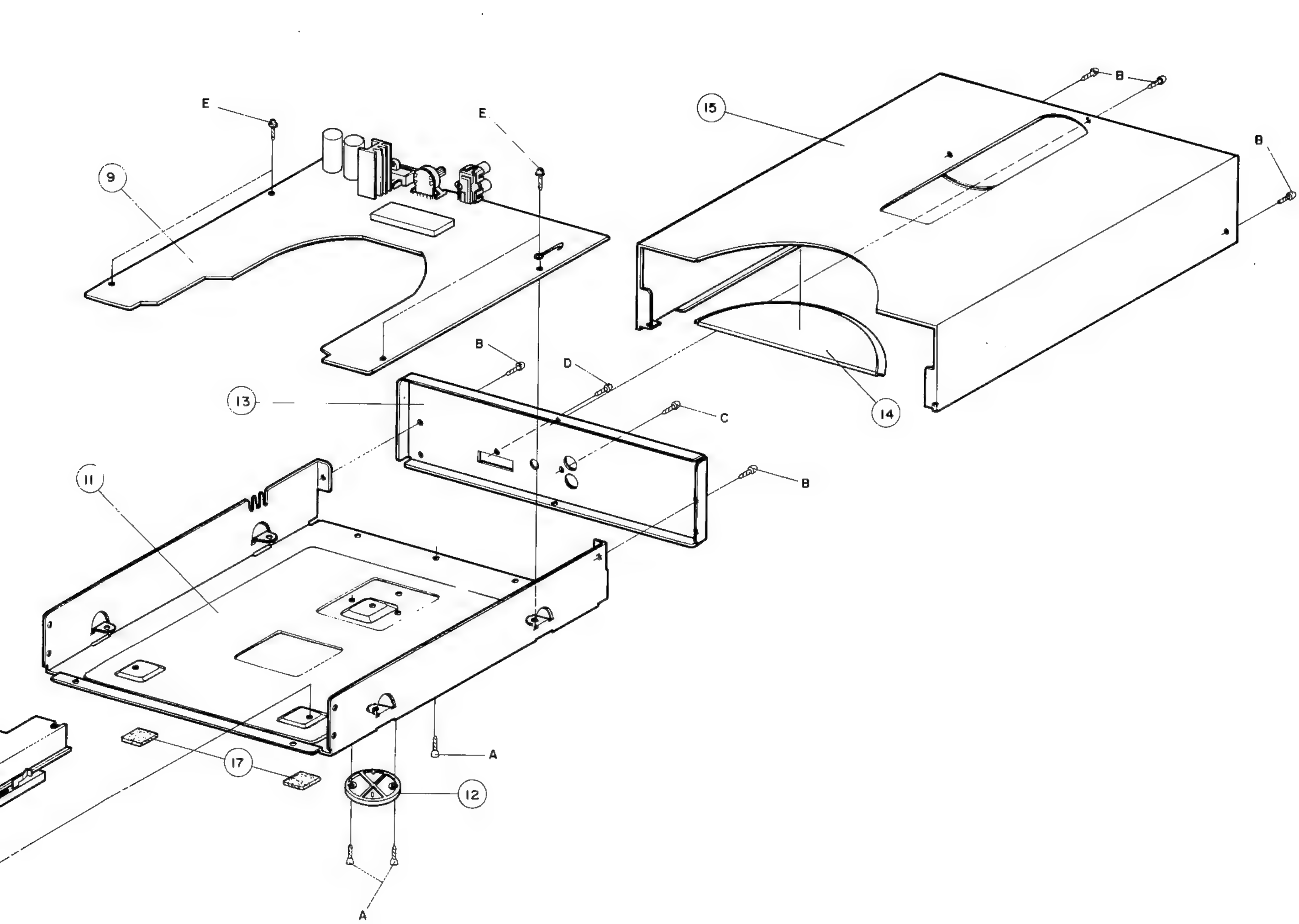
PARTS LIST

Ref. No.	Part No.	Description
1	7-685-862-(01)	SCREW (+)(2.6x6mm)
2	2-642-170-(01)	HINGE HOLDER
3	2-642-164-(01)	HINGE
4	2-642-160-(01)	SHAFT
5	2-642-137-(02)	COIL SPRING (B)
6	2-642-139-(02)	COIL SPRING (A)
7	2-642-158-(01)	INSULATOR (C)
8	2-642-169-(02)	ROLLER
9	2-642-159-(01)	PLATE (T)
10	2-642-142-(01)	SCREW
11	8-848-184-(01)	CD PLAYER SUB UNIT ASS'Y
13	X-2642-108-(1)	MAGNET ASS'Y
14	2-642-165-(01)	CHUCK CHASSIS
15	2-642-181-(01)	CHUCKING PULLEY
16	2-642-156-(02)	TRAY
17	2-642-149-(02)	GEAR COVER
18	7-685-535-(19)	SCREW (+)(2.6x10mm)
19	4-812-554-(01)	WASHER
20	2-642-154-(03)	DRIVE GEAR
21	2-642-153-(01)	CONTROL CAM
22	7-685-851-(01)	SCREW (+)(2x4mm)
23	1-572-052-(11)	LEAF SWITCH
24	3-558-708-(21)	LOCK WASHER
25	2-642-148-(01)	CENTER GEAR
26	3-653-387-(01)	LM BELT
27	4-913-731-(01)	LOADING PULLEY
28	7-621-775-(00)	SCREW (+)(2.6x3mm)
29	X-2641-336-(1)	MOTOR ASS'Y
30	1-624-793-(21)	MOTOR P. C. BOARD
31	2-642-161-(01)	TRAY HOLDER, FRONT
32	7-685-781-(01)	SCREW (+)(2x4mm)
33	2-642-162-(03)	TRAY HOLDER, REAR
34	2-642-146-(02)	TRAY GUIDE, RIGHT
35	2-642-147-(02)	TRAY GUIDE, LEFT
36	7-685-547-(19)	SCREW (+)(3x10mm)
37	2-642-510-(01)	HOLDER, RIGHT
38	2-642-512-(01)	HOLDER, REAR
39	2-642-511-(01)	HOLDER, LEFT
40	2-642-173-(01)	LINK PLATE
41	2-642-133-(02)	BOSS
42	X-2642-109-(1)	STOPPER LINK ASS'Y
43	2-642-172-(01)	SPACER
44	7-682-902-(31)	SCREW (+)(2.6x8mm)
45	1-564-721-(11)	CONNECTOR, 5 PIN
46	2-642-125-(01)	DAMPER
47	X-2642-106-(2)	MAIN CHASSIS ASS'Y
48	X-2642-105-(2)	SUB CHASSIS ASS'Y
49	2-642-157-(03)	FRONT TAPE
51	4-910-431-(02)	SLIDE SHAFT
52	8-848-127-(31)	PICK-UP ASS'Y
53	2-641-386-(01)	SPECIAL SCREW (2x5mm)
54	2-641-443-(02)	SLIDE HOLDER
55	7-621-255-(35)	SCREW (+)(2x5mm)
56	2-641-434-(01)	GEAR COVER
57	X-2641-358-(1)	SLIDE MOTOR ASS'Y
58	3-303-809-(31)	SPECIAL SCREW (M1.7x3mm)
59	2-641-404-(02)	GEAR (A)
60	2-641-403-(06)	GEAR (B)
61	2-641-447-(01)	SCREW (+)(2.6x8mm)
62	2-641-448-(02)	SHAFT CLAMP
63	X-2641-356-(1)	DISC MOTOR ASS'Y
64	1-570-053-(12)	LEAF SWITCH
65	1-628-263-(11)	MOTOR P. C. BOARD
66	1-564-720-(11)	CONNECTOR, 4 PIN
67	2-641-371-(01)	STOPPER

EXPLODED VIEW

CDP : CD-300/500





NOTE: A=(USA), B=(I,IB,BB)

NO	PARTS NAME	PARTS NO	MATERIAL	Q'TY	REMARK
1	DOOR .COVER	3-821-102-01	A6063-T5	1	A,B
2	PANEL . FRONT	3-819-802-01	A6063-T5	1	A,B
3	FOOT (L)	3-819-806-02	A6063-T5	1	A,B
4	FOOT (R)	3-819-807-01	A6063-T5	1	A,B
5	HOLDER . DOOR	3-819-805-04	ABS-720	1	A,B
6	PANEL . BASE	3-819-803-05	ABS-720	1	A,B
7	KNOB . TACT	3-819-804-01	ABS-720	1	A,B
8	LENS .KNOB	3-324-012-02	SBR (K-RESIN)	1	A,B
9	PCB . UNIT ASS'Y	A-170-856-02	MAIN	1	A,B
10	MECHANISM . CDP	2-219-116-01	SONY. MECHANISM	1	A,B
11	CHASSIS . MAIN	3-819-808-05	SECC T1.0	1	A,B
12	FOOT .REAR	3-324-011-01	ABS-720	1	A,B
13	PANEL .REAR	3-819-810-21	SECC T0.8	1	A,B
14	WINDOW . MECHA.	3-819-812-02	PMMA-60N	1	A,B
15	TOP . COVER	3-819-809-01	SECC T0.8 (SPRAY)	1	A,B
16	CUSHION . DOOR	3-819-815-03	FELT + TAPE (T0.5)	1	A,B
17	COVER . SCREW	3-819-816-01	EVA GRAY T5.5	2	A,B
18	DOOR . COVER(CD500)	3-821-002-01	A6063-T5	1	A,B
A	SCREW	7-464-408-01	CBZ 30P080FZK	9	A,B
B	SCREW	7-764-408-01	VBZ 30P080FZK	11	A,B
C	SCREW	7-999-166-01	PBT 30P100FZK	1	A,B
D	SCREW	7-764-410-01	VBZ 30P100FZK	1	A,B
E	SCREW	7-344-408-01	ATZ 30P080FZK	4	A,B

ELECTRICAL PARTS LIST

CDP : CD-300/500

REF. No	Part No.	Description
	PCB-1 MAIN P.C. BOARD	
	RESISTORS	
R505, 506	111510925	1Ω 1/2W, ±5%
R733, 734, 735, 736, 739, 740, 741, 742	111822925	2.2Ω 1/8W, ±5%
R507, 765, 766, 767, 768	111847925	4.7Ω 1/8W, ±5%
R602	111810025	10Ω 1/8W, ±5%
R105	111822025	22Ω 1/8W, ±5%
R757, 758	111847025	47Ω 1/8W, ±5%
R601, 749, 750, 755, 756	111810125	100Ω 1/8W, ±5%
R405, 727, 728	111822125	220Ω 1/8W, ±5%
R307, 725, 726	111833125	330Ω 1/8W, ±5%
R303, 304, 305, 501, 502, 737, 738	111847125	470Ω 1/8W, ±5%
R743, 744, 753, 754	111856125	560Ω 1/8W, ±5%
R110, 111, 411, 503, 504, 604, 605, 711, 712, 717 718, 731, 732,745, 746, 747, 748, 420, 421	111810225	1KΩ 1/8W, ±5%
R772, 773	111812225	1.2KΩ 1/8W, ±5%
R214, 404, 713, 714	111822225	2.2KΩ 1/8W, ±5%
R101, 774, 775	111839225	3.9KΩ 1/8W, ±5%
R106, 107, 415, 603	111847225	4.7KΩ 1/8W, ±5%
R769, 770	111868225	6.8KΩ 1/8W, ±5%
R206	111882225	8.2KΩ 1/8W, ±5%
R103, 109, 210, 211, 212, 302, 701, 702, 703 704, 705, 706, 707, 708, 729, 730	111810325	10KΩ 1/8W, ±5%
R709, 710	111812325	12KΩ 1/8W, ±5%
R403, 761, 762, 763, 764	111815325	15KΩ 1/8W, ±5%
R102	111818325	18KΩ 1/8W, ±5%
R104, 204, 216	111822325	22KΩ 1/8W, ±5%
R411, 406, 416	111847325	47KΩ 1/8W, ±5%
R402, 721, 722	111868325	68KΩ 1/8W, ±5%
R751, 752	111875325	75KΩ 1/8W, ±5%
R201, 715, 716	111882325	82KΩ 1/8W, ±5%
R108, 202, 207, 209, 301, 407, 408, 719, 720 759, 760	111810425	100KΩ 1/8W, ±5%
R203, 205, 213, 409, 410	111812425	120KΩ 1/8W, ±5%
R414	111815425	150KΩ 1/8W, ±5%
R723, 724	111818425	180KΩ 1/8W, ±5%
R208	111851425	510KΩ 1/8W, ±5%
R219, 401, 412, 413	111810525	1MΩ 1/8W, ±5%
	CONTROLS	
VR701	250139301	20KB X 2 RK16K1250101-20KB
VR101, 103, 104	251222301	6MM(RH0615C), 22K
VR102	251247301	6MM(RH0615C), 47K
VR201	251222201	6MM(RH0615C), 2.2K
	CAPACITORS	
C715, 716	19Y610011	10pF, ±5%, 50V, MICA
C703, 704	19Y633041	33pF, ±5%, 50V, MICA
C701, 702	19Y682041	82pF, ±5%, 50V, MICA
C711, 712	194310065	10μF, ±20%, 16V, AH ELEC
C713, 714	194233065	33μF, ±20%, 10V, AH ELEC
C601, 602, 603, 604, 605, 606	194247065	47μF, ±20%, 10V, AH ELEC
C717, 718, 723, 724, 727, 728	194210167	100μF, ±20%, 10V, AH ELEC
C706, 707, 708, 709	194222167	220μF, ±20%, 10V, AH ELEC
C607, 608	180605015	5pF, CH, 50V, ±5%, CERAMIC
C401, 402	180610015	10pF, CH, 50V, ±5%, CERAMIC
C102	180612045	12pF, CH, 50V, ±5%, CERAMIC
C106, 112, 210, 301, 303, 404, 609	175647345	47000pF, F, 50V, ±5%, CERAMIC
C103	150610245	1000pF, 50V, ±5%, MYLAR
C705, 706, 719, 720, 721, 722	150615245	1500pF, 50V, ±5%, MYLAR
C101	150622245	2200pF, 50V, ±5%, MYLAR
C116, 117, 211	150647245	4700pF, 50V, ±5%, MYLAR
C725, 726	150656245	5600pF, 50V, ±5%, MYLAR
C108, 111, 207, 208, 215	150610345	10000pF, 50V, ±5%, MYLAR

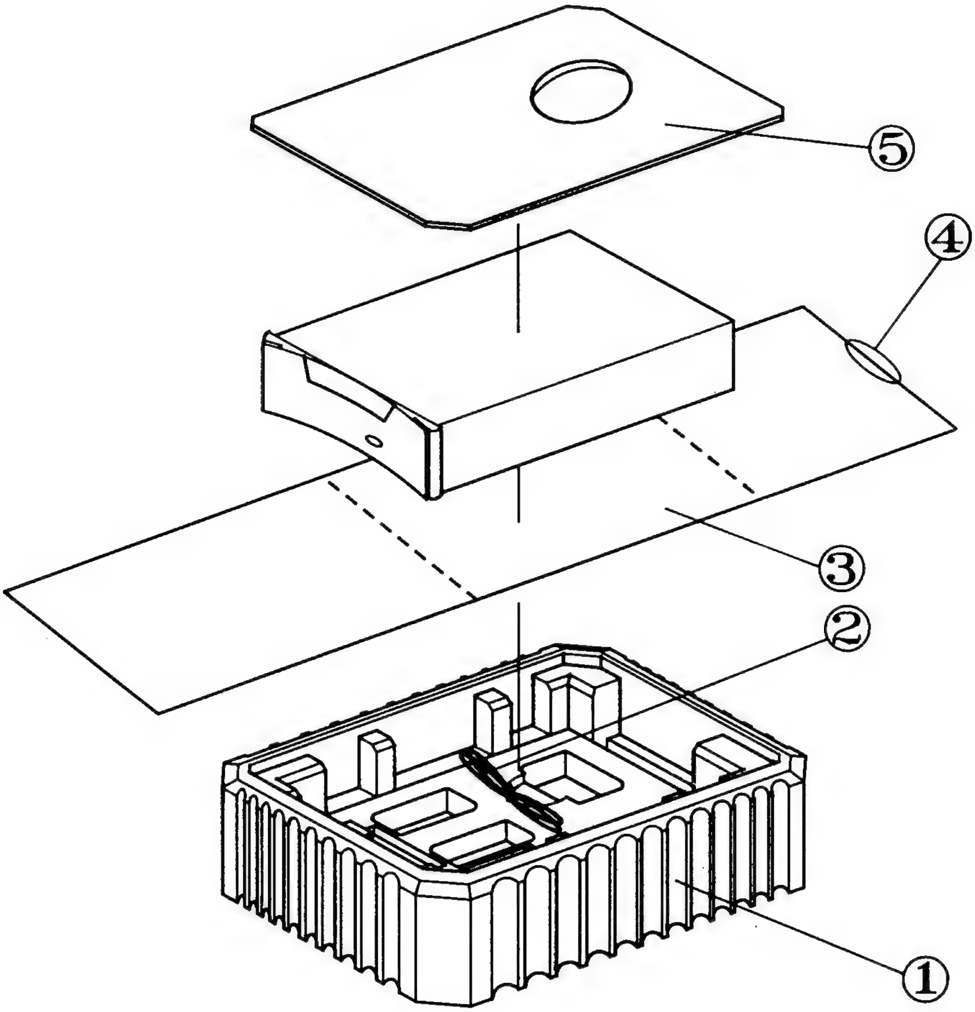
REF. No	Part No.	Description
C105, 109, 216	150633345	33000pF, 50V, ±5%, MYLAR
C202	150647345	47000pF, 50V, ±5%, MYLAR
C201, 204, 501, 502,	150610445	100000pF ± 50V, ±5%, MYLAR
C110, 217	141647865	0.47μF, ±20%, 50V, ELEC
C212, 213. 403	141601065	1μF, ±20%, 50V, ELEC
C203, 403	141647965	4.7μF, ±20%, 50V, ELEC
C206	141610065	10μF, ±20%, 50V, ELEC
C104, 107, 113, 114, 115, 205, 209, 214, 219 302, 304, 405	141247065	47μF, ±20%, 10V, ELEC
⚠ C505, 506	141322165	220μF, ±20%, 16V, ELEC
⚠ C507, 508	141210267	1000μF, ±20%, 10V, ELEC
⚠ C503, 504	141347267	4700μF, ±20%, 16V, ELEC
C406	144622965	2.2μF, ±20%, 50V, ELEC
	INTEGERATED CIRCUITS	
IC101	2440418741	CXA-1081S(DIP TYPE)
IC201	2440408741	CXA-1082BQ
IC301	2440423741	CXD-1167Q, DSP+SRAM
IC401	2600103011	ZTAT, HD4074008S
	OR 2600153021	LE1043, HMCS408AC
IC601	2441437511	MN6471M
IC202	2442026791	STA341M
IC402	244123671	MC4558C
	TRANSISTORS	
Q501, 502, 701, 702, 715, 716	2404111351	2SK24GR F.E.T
⚠ Q503	240111221	KTB1366
⚠ Q504	240215321	KTD2058
Q505, 507, 703, 704, 707, 708, 713, 714, 719, 720	240218035	2SC1571G
Q506, 508, 705, 706, 709, 710, 711, 712 717, 718	240015735	2SA929G
Q201, 403, 602	240211125	KTC3198Y
Q402	240211425	KTC3203Y
Q101, 202, 401	240010825	KTA1271Y
Q203	240215215	MPSA25(DARINGTON)
Q725	240610715	KSR2001
Q726	240610915	KSR1003
Q601	240610615	KRA103M
Q721, 722, 723, 724	240215415	KTC2878A
	DIODES	
⚠ D501, 502, 503, 504	2413581651	1N4003L
D101, 402, 403	241017995	1SS133
⚠ D505, 506	242106245	ZENER 1N73A 6.2V
	MISCELLANEOUS	
X401	213816601	6MHZ, X-TAL(at IC401:HD4074008S)
	OR 213816701	3MHZ, X-TAL(at IC401:LE1043, HMCS408AC)
X601	213818101	33.8688MHZ(3RD)
WA101, 301, 302	216812101	2.5M/M, 2P, NKCO21
WA104, 403	216812401	2.5M/M, 5P, NICC-024-0
WA102	216842401	STRAIGHT TYPE, 8P, 2M/M
WA401, 402	216810101	2P, 2MM
WA201	216836001	00-8283-0412-0000 4P, 2M/M
WA103	216844501	4P, 2M/M, RED
WA202	216844601	4P, 2M/M, YELLOW
WA501	216846901	13P, 52303-1311, BLACK
CN401, 402	215997901	2P, 2M/M, 350M/M
L101	103410035	10UH, AL03(7MM) ±10%
HS501	371070203	40MM, AL
JAC701	215561701	GOLD WHITE. RED, P:14

PCB-2 CONTROL P.C. BOARD

REF. No	Part No.	Description
	RESISTORS	
R406	111833125	330Ω 1/8W, ±5%
	L.E. DIOED	
D401	241949345	R34MC F02, F=4MM
	SWITCH	
SW401	220899901	177-620-002-000, KHH-10910

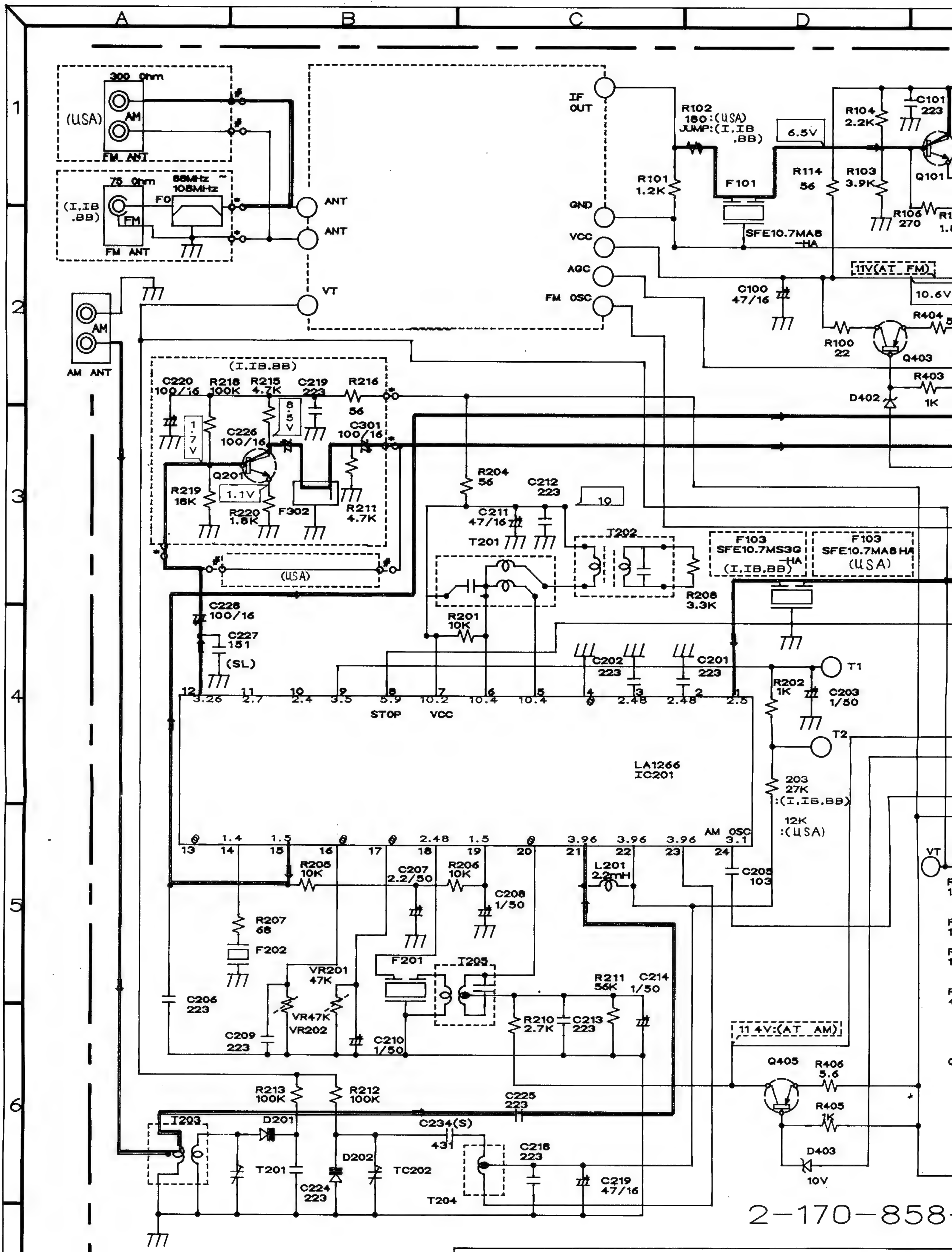
REF. No	Part No.	Description
	PCB–4 SUB P.C. BOARD	
	INTEGRATED CIRCUITS	
IC1	2600151011	LE1041 MSM65511RS CPU
IC2	2440323631	BA6238A MOTOR DRIVER
IC3	2440324631	BA10393
	TRANSISTORS	
Q15, 16	240210925	KTC1627A–Y, PA
Q17	240215215	MPSA26, DARINGTDN
Q22, 23	240211135	KTC3198GR
	CONTROLS	
VR1	2514203011	20KB EVNDCAAO3B24
	RESISTORS	
R33, 43	111415225	1.5KΩ, 1/4W, ±5%
R84, 85	111810225	1KΩ, 1/8W, ±5%
R42	111847125	470Ω, 1/8W, ±5%
R15, 16, 17, 24, 25, 43	111810325	10KΩ, 1/8W, ±5%
R18	111822325	22KΩ, 1/8W, ±5%
R19, 37, 48, 49, 50, 51, 52, 53, 54, 55 56, 57, 75, 77, 78	111847325	47KΩ, 1/8W, ±5%
R40	111822125	220Ω, 1/8W, ±5%
R26	111410025	10Ω, 1/4W, ±5%
R28, 29, 30	111418225	1.8KΩ, 1/4W, ±5%
R31	111433225	3.3KΩ, 1/4W, ±5%
R32	111439225	3.9KΩ, 1/4W, ±5%
R35, 36	111447025	47Ω, 1/4W, ±5%
R39	111822425	220KΩ, 1/8W, ±5%
R68	111868325	68KΩ, 1/8W, ±5%
R41	111847225	4.7KΩ, 1/8W, ±5%
R44	111810525	1MΩ, 1/8W, ±5%
R45, 46	111812325	12KΩ, 1/8W, ±5%
R59, 60, 61, 72, 73	111810425	100KΩ, 1/8W, ±5%
R63, 64, 67	111822225	2.2KΩ, 1/8W, ±5%
R65, 66, 68	111833325	33KΩ, 1/8W, ±5%
	CAPACITORS	
C15, 16, 17	175647395	47000pF, ±20%, 50V
C18, 20	175610395	10000pF, ±20%, 50V
C22	175610495	100000pF, ±20%,50V
C55	175610395	10000pF, ±20%, 50V
	MISCELLANEOUS	
CN109	2168456011	SBRK16S–1 16P
WA110	2168392011	52257–1110, 11P,
WA112, 114	2168389011	52257–0510, 5P,
WA111, 113	2168394011	52257–1510, 15P,
X1	2138185011	FCR4.0, MCT3, CERAMIC OSC

CDP : CD-300/500

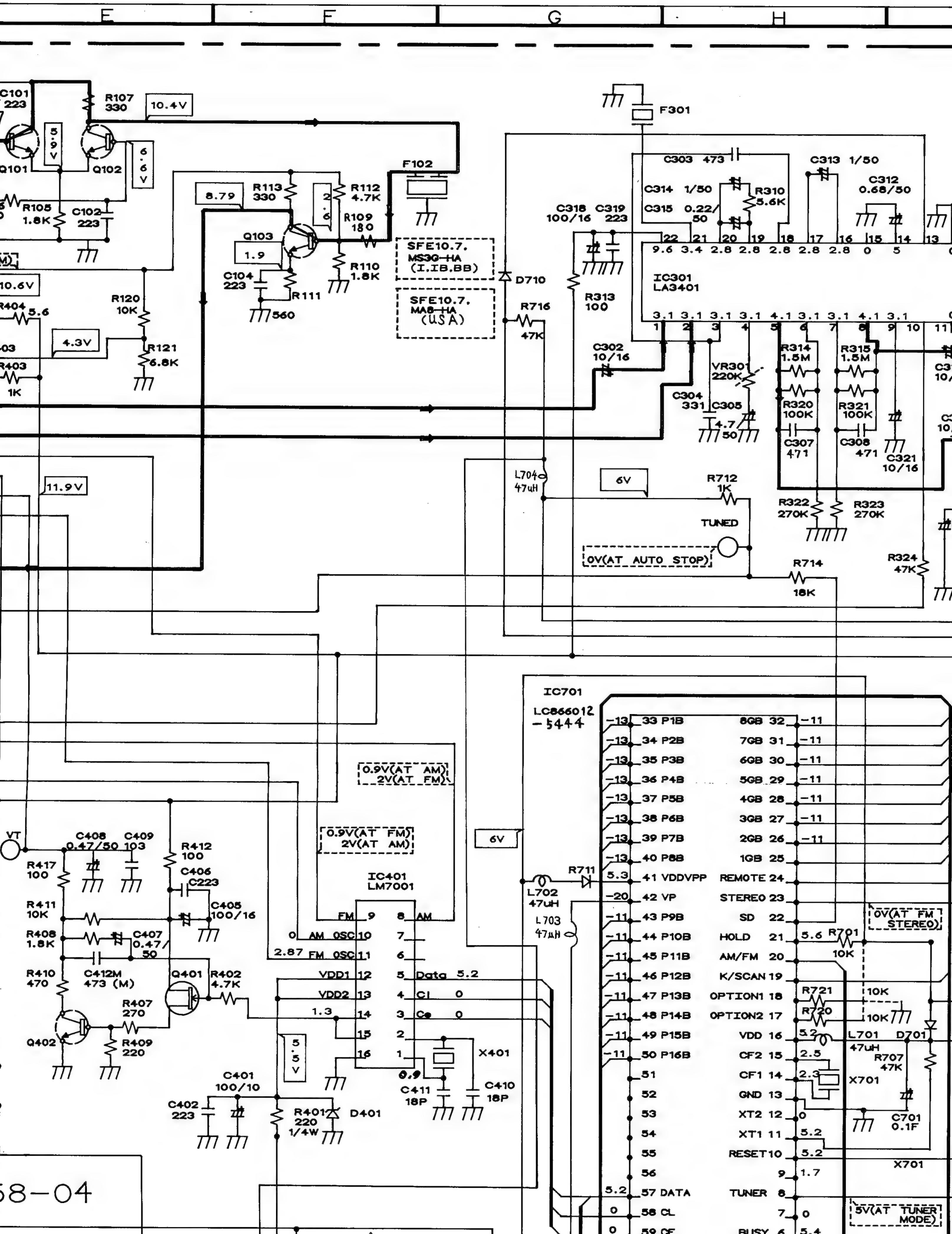


NO	PARTS NAME	PARTS NO.	Q'TY
1	PAD BOTTOM	3-819-811-01	1
2	PIN CORD	2-212-140-01	1
3	SHEET POLY	3-324-029-01	1
4	STICKER SET	3-819-817-01	1
5	INNER LID	3-324-019-01	1

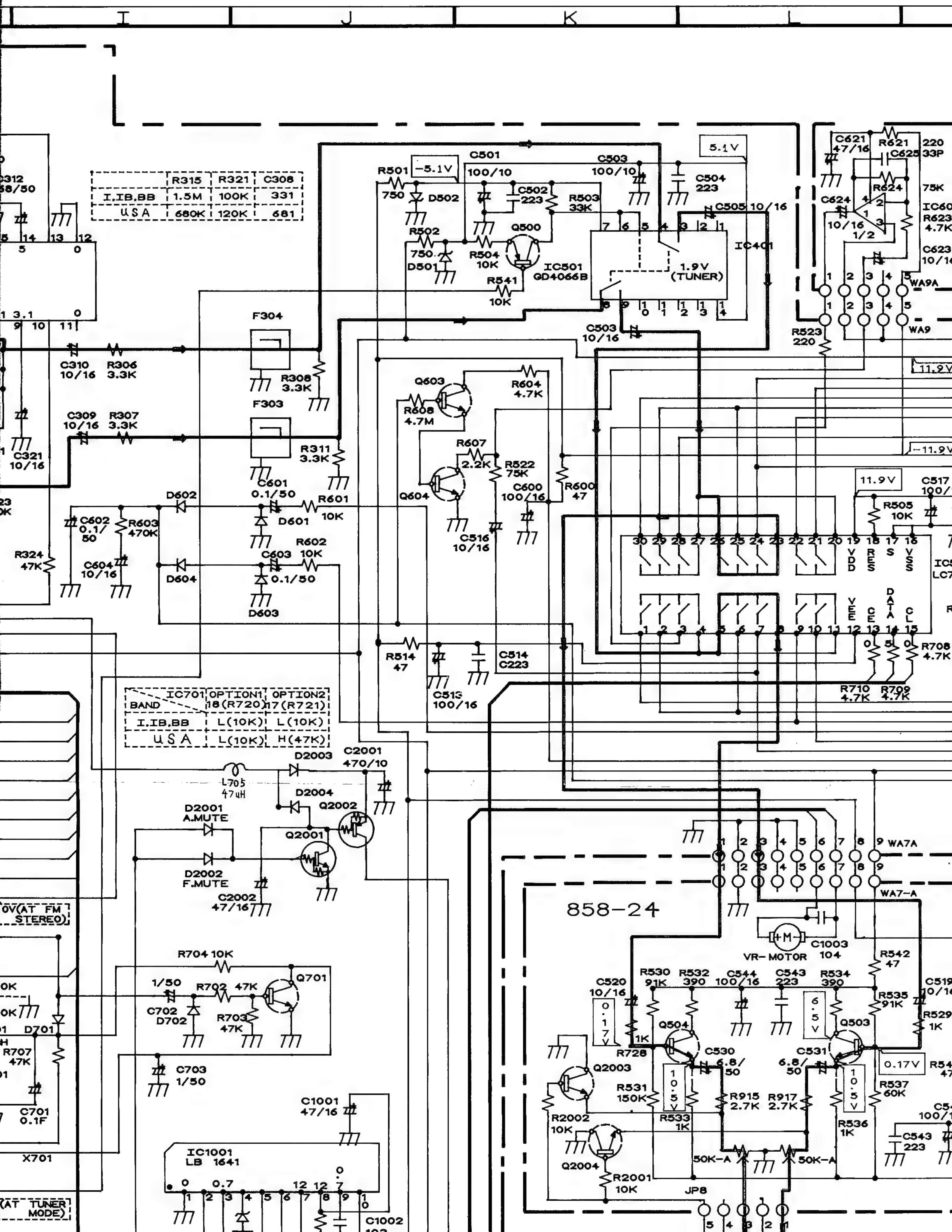
SCHEMATIC DIAGRAM (TUNER)



2-170-858-

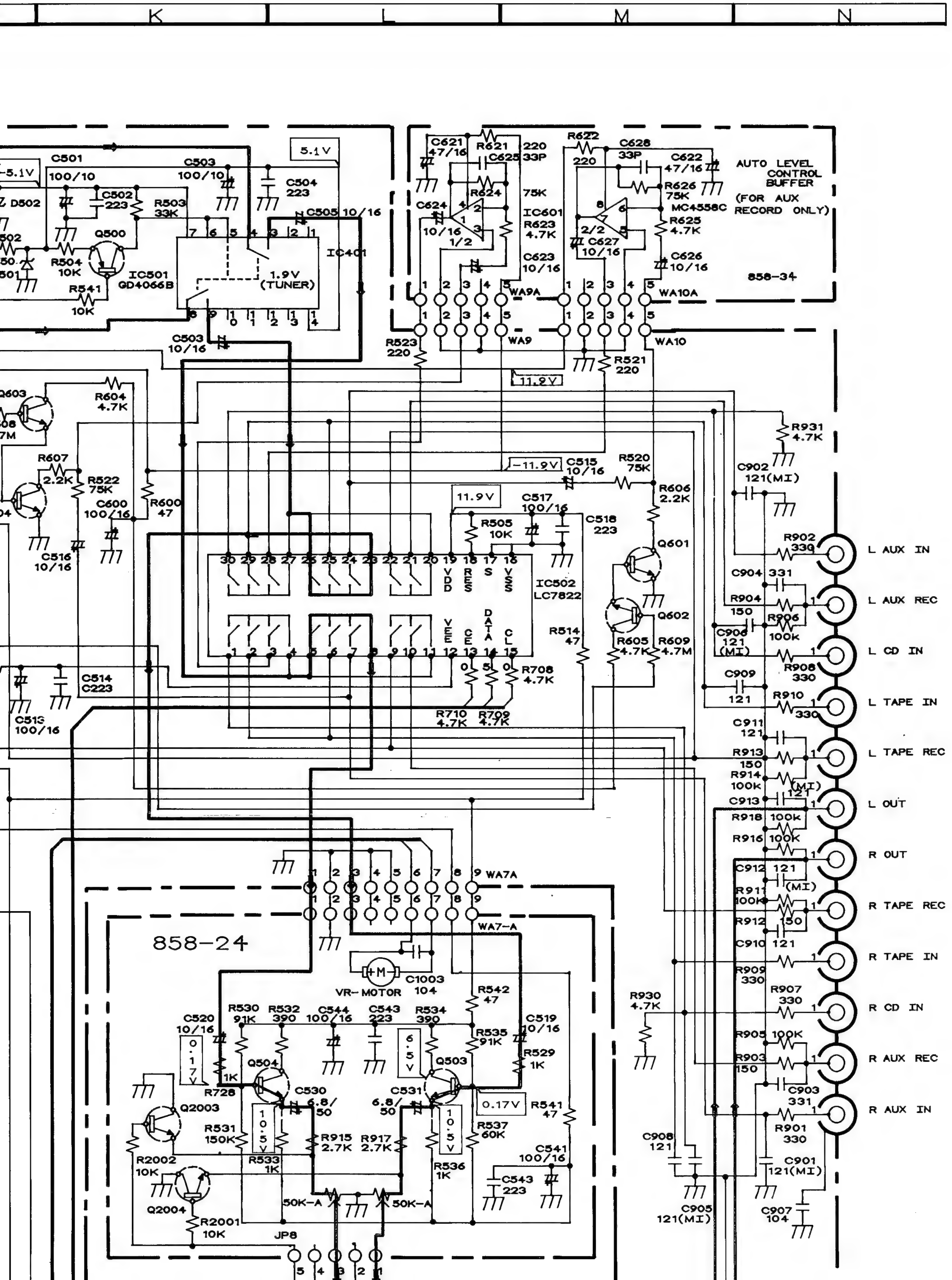


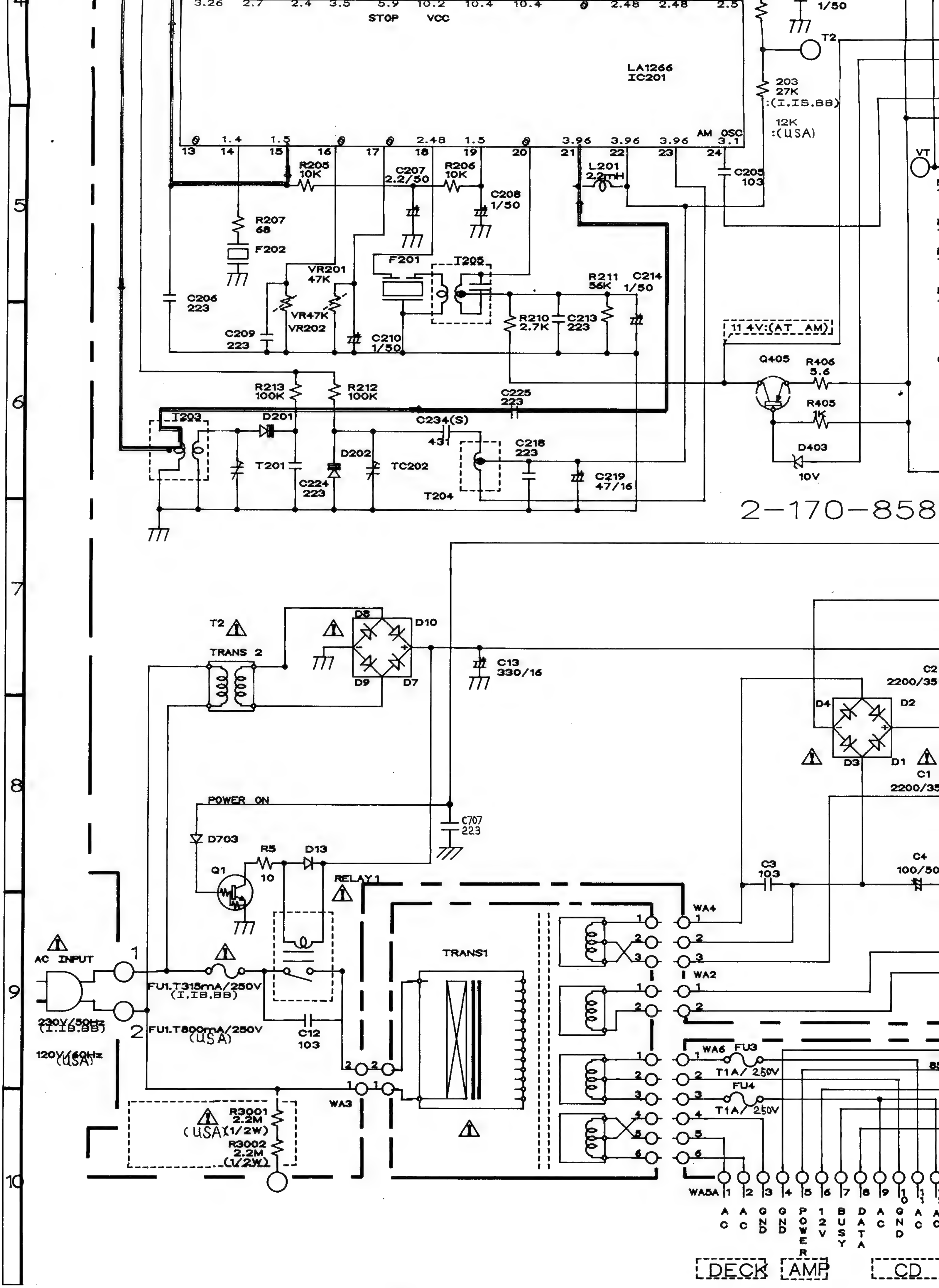
E
F
G
H
C101
223
R107
330
10.4V
Q101
Q102
5.9V
6.6V
F102
R113
330
R112
4.7K
8.79
R105
1.8K
C102
223
R109
180
Q103
1.9
R110
1.8K
C104
223
R111
560
SFE10.7.
MS3G-HA
(I.IB.BB)
SFE10.7.
MA8-HA
(USA)
D710
10.6V
R120
10K
R404
5.6
R121
6.8K
4.3V
R403
1K
R716
47K
F301
C303 473
C313 1/50
C312
0.68/50
C314 1/50
C315 0.22/50
R310
5.6K
C318 100/16
C319 223
R313
100
IC301
LA3401
9.6 3.4 2.8 2.8 2.8 2.8 2.8 0 5
3.1 3.1 3.1 3.1 4.1 3.1 3.1 4.1 3.1
C302
10/16
VR301
220K
R314
1.5M
R315
1.5M
C304
331
C305
4.7
50
R320
100K
R321
100K
C307
471
C308
471
C321
10/16
11.9V
L704
47uH
6V
R712
1K
R322
270K
R323
270K
TUNED
0V(AT AUTO STOP)
R714
18K
R324
47K
IC701
LC866012
-5444
33 P1B
34 P2B
35 P3B
36 P4B
37 P5B
38 P6B
39 P7B
40 P8B
41 VDDVPP
42 VP
43 P9B
44 P10B
45 P11B
46 P12B
47 P13B
48 P14B
49 P15B
50 P16B
51
52
53
54
55
56
57 DATA
58 CL
8GB 32
7GB 31
6GB 30
5GB 29
4GB 28
3GB 27
2GB 26
1GB 25
REMOTE 24
STEREO 23
SD 22
HOLD 21
AM/FM 20
K/SCAN 19
OPTION1 18
OPTION2 17
VDD 16
CF2 15
CF1 14
GND 13
XT2 12
XT1 11
RESET 10
9
TUNER 8
7
BUSY 6
0.9V(AT AM)
2V(AT FM)
0.9V(AT FM)
2V(AT AM)
6V
VT
C408
0.47/50
C409
103
R412
100
R417
100
C406
C223
R411
10K
C405
100/16
R408
1.8K
C407
0.47/50
R410
470
C412M
473 (M)
Q401
R402
4.7K
R407
270
Q402
R409
220
IC401
LM7001
FM 9
8 AM
AM OSC 10
7
2.87 FM OSC 11
6
VDD1 12
5 Data 5.2
VDD2 13
4 CI 0
1.3 14
3 Ce 0
15
2
16
1
5.5V
X401
C411
18P
C410
18P
C401
100/10
C402
223
R401
220
1/4W
D401
R711
L702
47uH
L703
47uH
0V(AT FM STEREO)
R701
10K
R721
R720
10K
10K
L701
47uH
D701
R707
47K
X701
C701
0.1F
5V(AT TUNER MODE)
58-04



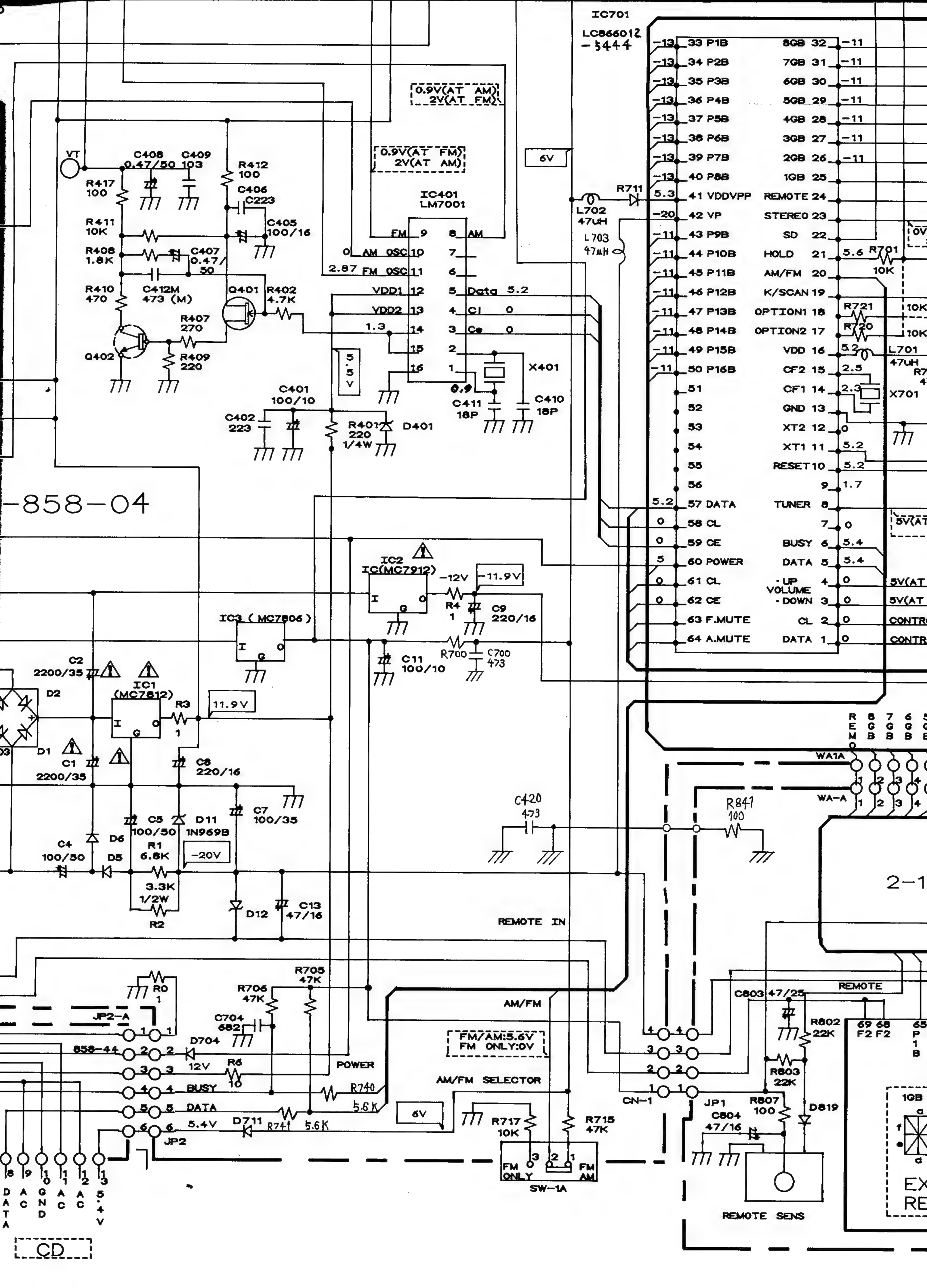
	R315	R321	C308
I,IB,BB	1.5M	100K	331
USA	680K	120K	681

IC701 BAND	OPTION1 18(R720)	OPTION2 17(R721)
I,IB,BB	L(10K)	L(10K)
USA	L(10K)	H(47K)

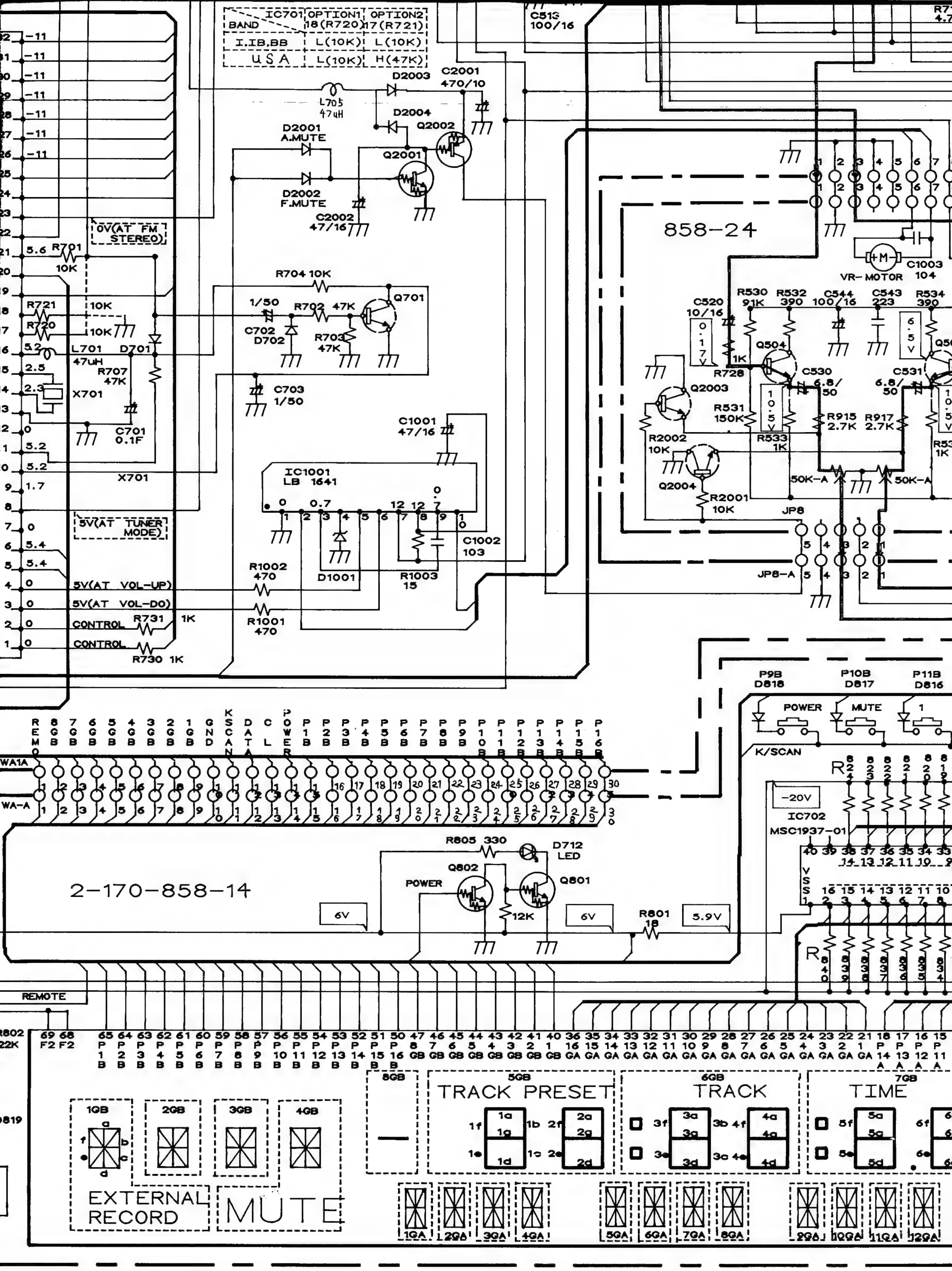

K
L
M
N
AUTO LEVEL CONTROL BUFFER (FOR AUX RECORD ONLY)
858-34
858-24
IC401
IC501 GD4066B
IC502 LC7822
IC601 MC4558C
1.9V (TUNER)
5.1V
11.9V
-11.9V
0.17V
VR-MOTOR
WA9A
WA10A
WA9
WA10
WA7A
WA7-A
JP8
L AUX IN
L AUX REC
L CD IN
L TAPE IN
L TAPE REC
L OUT
R OUT
R TAPE REC
R TAPE IN
R CD IN
R AUX REC
R AUX IN



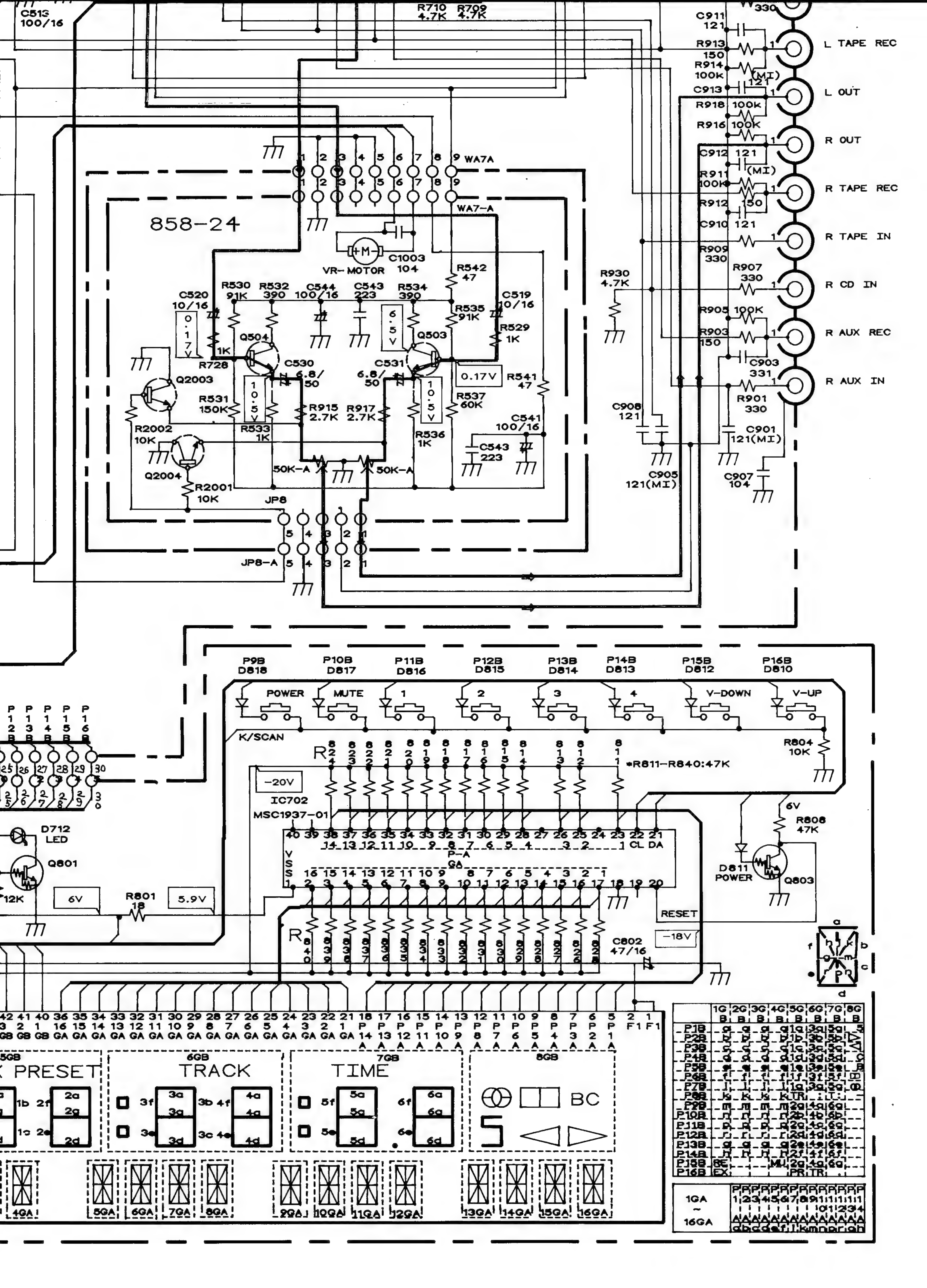
LA1266
IC201
STOP
VCC
AM OSC
203
27K
:(I.IB.BB)
12K
:(USA)
R205
10K
R206
10K
C207
2.2/50
C208
1/50
L201
2.2mH
C205
103
R207
68
F202
F201
T205
VR201
47K
VR47K
VR202
C206
223
C209
223
C210
1/50
R210
2.7K
C213
223
R211
56K
C214
1/50
11.4V:(AT AM)
Q405
R406
5.6
R405
1K
D403
10V
VT
T2
R213
100K
R212
100K
C225
223
T203
D201
C234(S)
431
C218
223
C219
47/16
T201
C224
223
D202
TC202
T204
2-170-858
T2
TRANS 2
D8
D10
D9
D7
C13
330/16
C2
2200/35
D4
D2
D3
D1
C1
2200/35
POWER ON
C707
223
D703
R5
10
D13
Q1
RELAY1
C3
103
C4
100/50
WA4
WA2
WA6
FU3
T1A/ 250V
FU4
T1A/ 250V
TRANS1
AC INPUT
FU1.T315mA/250V
(I.IB.BB)
FU1.T800mA/250V
(USA)
230V/50Hz
(I.IB.BB)
120V/60Hz
(USA)
C12
103
WA3
R3001
2.2M
(USA)(1/2W)
R3002
2.2M
(1/2W)
WA5A
AC
AC
GND
GND
POWER
12V
BUSY
DATA
AC
GND
AC
DECK
AMP
CD



IC701
LC866012
-5444
33 P1B
34 P2B
35 P3B
36 P4B
37 P5B
38 P6B
39 P7B
40 P8B
41 VDDVPP
42 VP
43 P9B
44 P10B
45 P11B
46 P12B
47 P13B
48 P14B
49 P15B
50 P16B
51
52
53
54
55
56
57 DATA
58 CL
59 CE
60 POWER
61 CL
62 CE
63 F.MUTE
64 A.MUTE
8GB 32
7GB 31
6GB 30
5GB 29
4GB 28
3GB 27
2GB 26
1GB 25
REMOTE 24
STEREO 23
SD 22
HOLD 21
AM/FM 20
K/SCAN 19
OPTION1 18
OPTION2 17
VDD 16
CF2 15
CF1 14
GND 13
XT2 12
XT1 11
RESET 10
9
TUNER 8
7
BUSY 6
DATA 5
· UP
VOLUME
· DOWN
CL 2
DATA 1
0.9V(AT AM)
2V(AT FM)
0.9V(AT FM)
2V(AT AM)
6V
R711
L702
47uH
L703
47μH
R701
10K
R721
R720
L701
47uH
X701
IC401
LM7001
FM 9
8 AM
AM OSC 10
FM OSC 11
VDD1 12
VDD2 13
14
15
16
Data 5.2
CI 0
Ce 0
X401
C411
18P
C410
18P
VT
C408
0.47/50
C409
103
R412
100
R417
100
C406
C223
C405
100/16
R411
10K
R408
1.8K
C407
0.47/50
R410
470
C412M
473 (M)
Q401
R402
4.7K
R407
270
Q402
R409
220
C401
100/10
C402
223
R401
220
1/4W
D401
-858-04
IC2
IC(MC7912)
-12V
-11.9V
R4
1
C9
220/16
IC3 (MC7806)
C11
100/10
R700
C700
473
C2
2200/35
IC1
(MC7812)
R3
1
11.9V
D2
D1
C1
2200/35
C8
220/16
C7
100/35
C5
100/50
D11
1N969B
C4
100/50
D6
D5
R1
6.8K
-20V
3.3K
1/2W
R2
D12
C13
47/16
C420
473
R847
100
REMOTE IN
WA1A
WA-A
R E M O
8 G B
7 G B
6 G B
2-1
REMOTE
C803 47/25
R802
22K
69 F2
68 F2
65 P 1 B
R803
22K
R807
100
D819
JP1
C804
47/16
REMOTE SENS
CN-1
R0
1
JP2-A
R706
47K
R705
47K
C704
682
D704
858-44
12V
R6
10
POWER
BUSY
DATA
5.4V
D711
R741
5.6K
R740
5.6K
6V
JP2
AM/FM
FM/AM:5.6V
FM ONLY:0V
AM/FM SELECTOR
R717
10K
R715
47K
FM ONLY
FM AM
SW-1A
DATA
AC
GND
AC
AC
5.4V
CD
1GB
EX
RE
5V(AT
CONTR

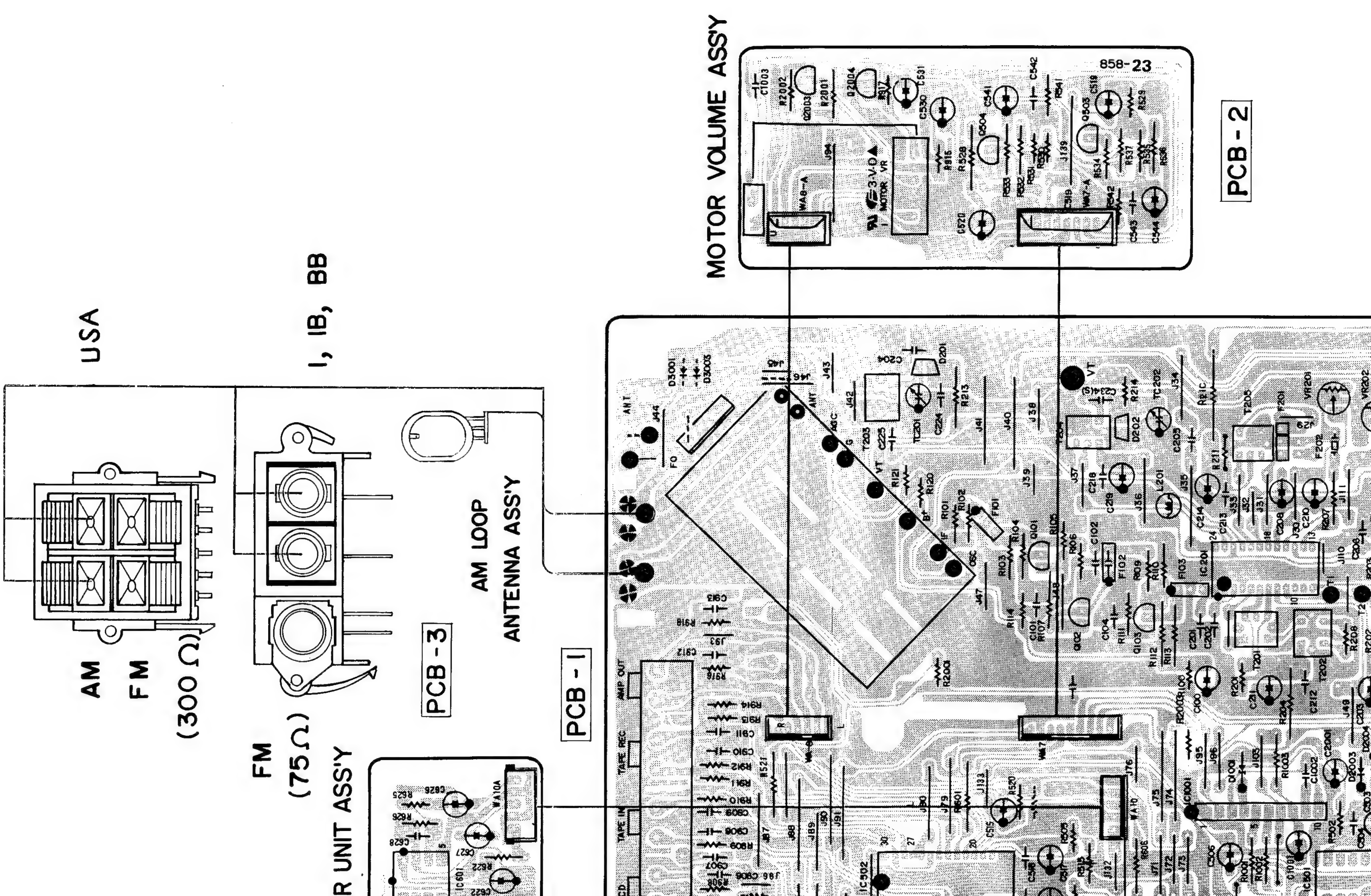


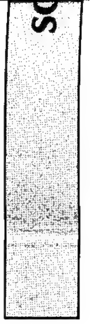
IC701 OPTION1 OPTION2
BAND 18(R720) 17(R721)
I.IB.BB L(10K) L(10K)
USA L(10K) H(47K)
D2003
C2001 470/10
L705 47uH
D2004
Q2002
D2001 A.MUTE
Q2001
D2002 F.MUTE
C2002 47/16
0V(AT FM STEREO)
R701 10K
R704 10K
Q701
R721
R720
10K
1/50
R702 47K
C702
D702
R703 47K
L701 47uH
D701
R707 47K
X701
C703 1/50
C701 0.1F
C1001 47/16
IC1001 LB 1641
C1002 103
D1001
R1003 15
R1002 470
R1001 470
5V(AT TUNER MODE)
5V(AT VOL-UP)
5V(AT VOL-DO)
CONTROL
CONTROL
R731 1K
R730 1K
C513 100/16
858-24
VR-MOTOR
C1003 104
R530 91K
R532 390
C544 100/16
C543 223
R534 390
C520 10/16
Q504
R728 1K
C530 6.8/50
C531 6.8/50
Q2003
R531 150K
R915 2.7K
R917 2.7K
R533 1K
R2002 10K
Q2004
R2001 10K
50K-A
50K-A
JP8
JP8-A
P9B D818
P10B D817
P11B D816
POWER
MUTE
K/SCAN
-20V
IC702
MSC1937-01
REMO
GND
KSCAN
DATA
CL
POWER
WA1A
WA-A
R805 330
D712 LED
Q802
Q801
POWER
2-170-858-14
6V
12K
6V
R801 18
5.9V
REMOTE
R802 22K
F2 F2
8GB
5GB
TRACK PRESET
6GB
TRACK
7GB
TIME
1GB
2GB
3GB
4GB
EXTERNAL RECORD
MUTE
1GA 2GA 3GA 4GA
5GA 6GA 7GA 8GA
9GA 10GA 11GA 12GA

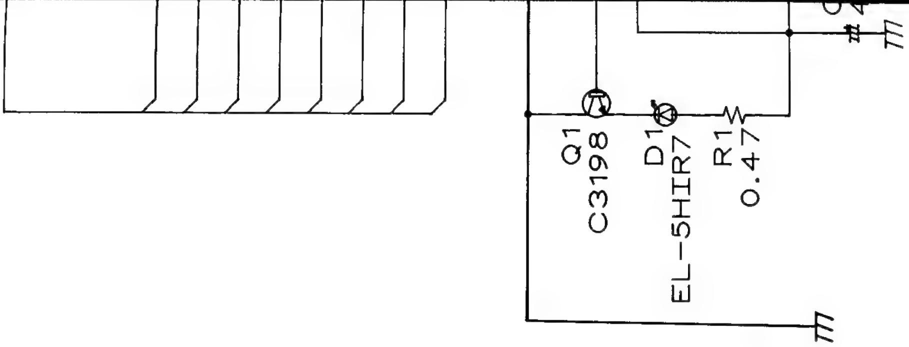


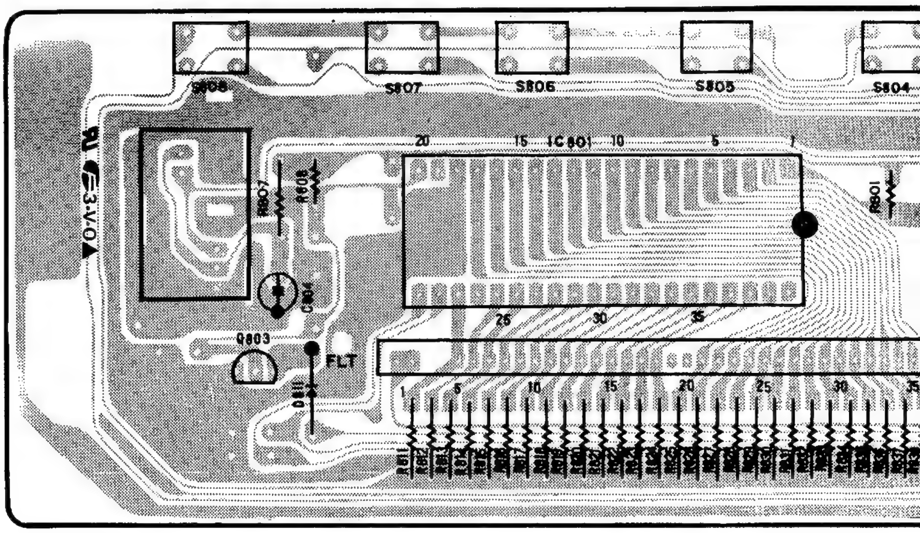
C513 100/16
R710 4.7K
R709 4.7K
C911 121
R913 150
R914 100K
(MI)
C913 121
R918 100K
R916 100K
C912 121
(MI)
R911 100K
R912 150
C910 121
R909 330
R907 330
R930 4.7K
R905 100K
R903 150
C903 331
R901 330
C908 121
C905 121(MI)
C901 121(MI)
C907 104
L TAPE REC
L OUT
R OUT
R TAPE REC
R TAPE IN
R CD IN
R AUX REC
R AUX IN
WA7A
WA7-A
858-24
VR-MOTOR
C1003 104
R542 47
R530 91K
R532 390
C544 100/16
C543 223
R534 390
R535 91K
C520 10/16
C519 10/16
R529 1K
0.17V
Q504
Q503
R728 1K
Q2003
C530 6.8/50
C531 6.8/50
R541 47
R531 150K
R537 60K
R915 2.7K
R917 2.7K
R533 1K
R536 1K
C541 100/16
C543 223
R2002 10K
Q2004
R2001 10K
50K-A
JP8
JP8-A
P9B D818
P10B D817
P11B D816
P12B D815
P13B D814
P14B D813
P15B D812
P16B D810
POWER
MUTE
1
2
3
4
V-DOWN
V-UP
K/SCAN
R804 10K
*R811-R840:47K
-20V
IC702
MSC1937-01
VSS
P-A
GA
CL
DA
6V
R808 47K
D811 POWER
Q803
RESET
-18V
C802 47/16
D712 LED
Q801
12K
6V
R801 18
5.9V
PRESET
TRACK
TIME
5GB
6GB
7GB
8GB
BC
1GA ~ 16GA
4GA
5GA
6GA
7GA
8GA
9GA
10GA
11GA
12GA
13GA
14GA
15GA
16GA

Tuner

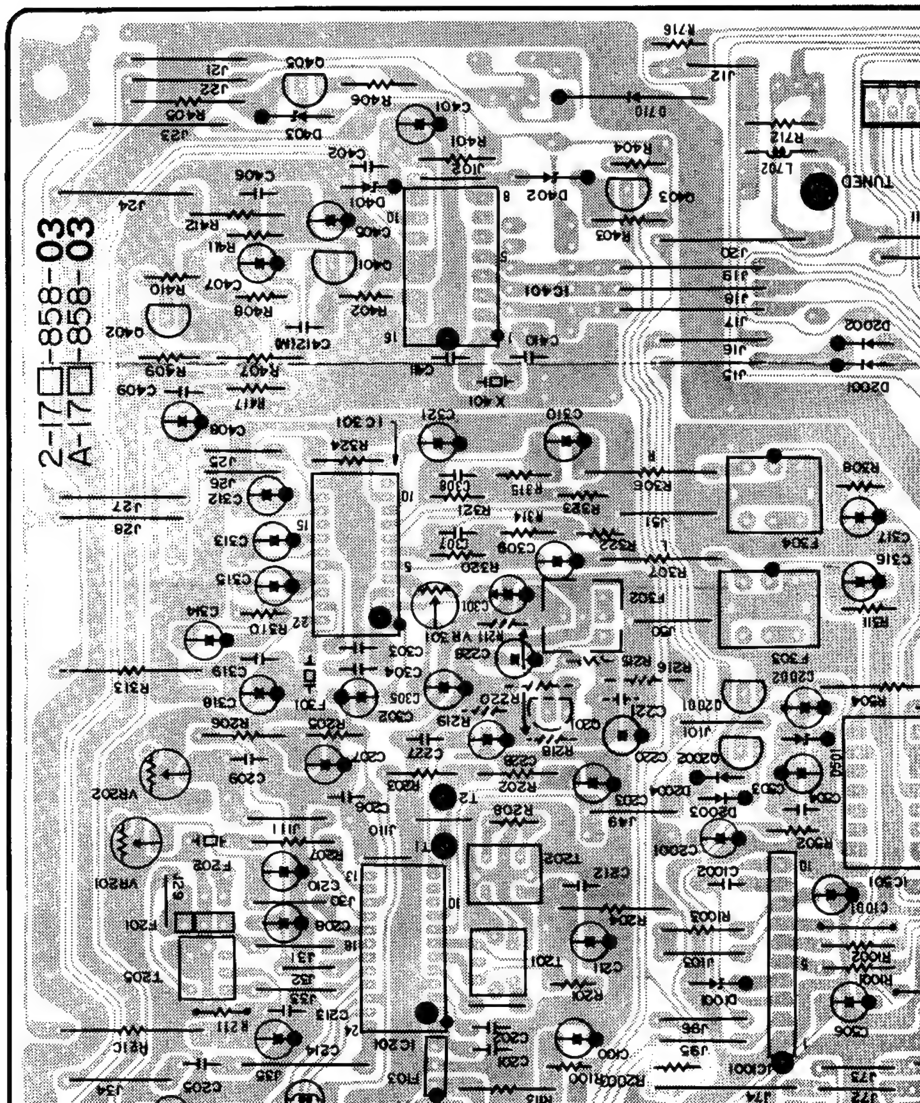

MOTOR VOLUME ASS'Y
858-23
PCB - 2
USA
I, IB, BB
AM
FM
(300 Ω)
FM
(75 Ω)
AM LOOP
ANTENNA ASS'Y
PCB - 3
PCB - I
R UNIT ASS'Y
AMP OUT
TAPE REC
TAPE IN



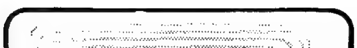




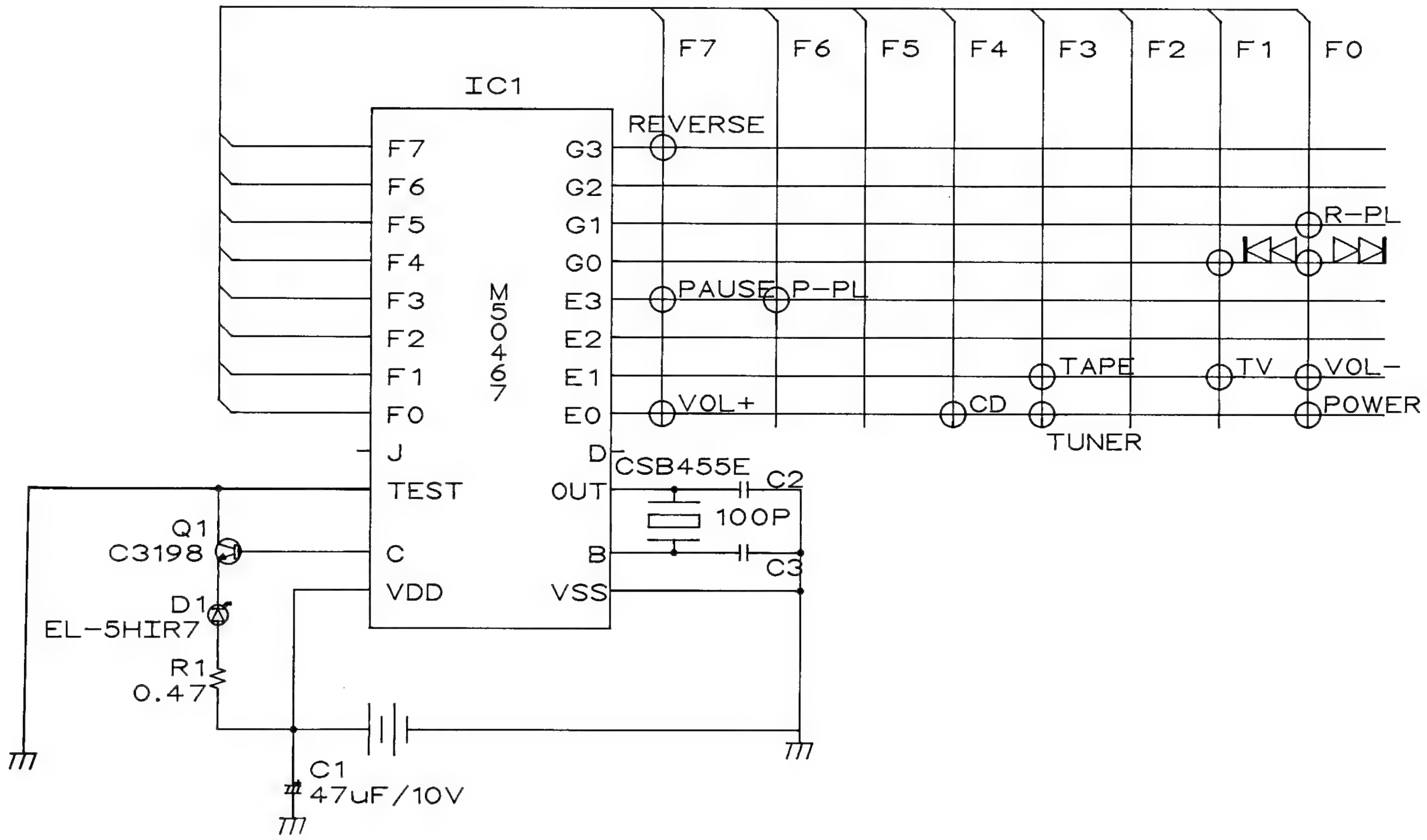
CONTROL UNIT ASS'Y

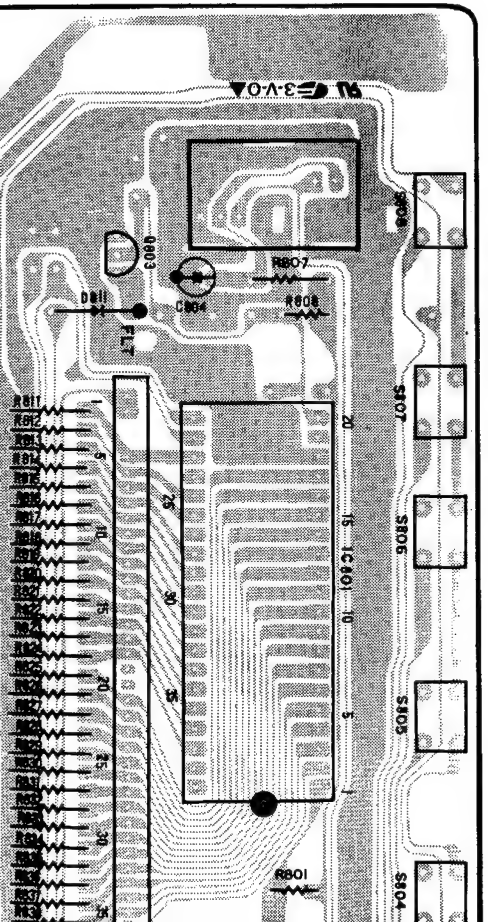


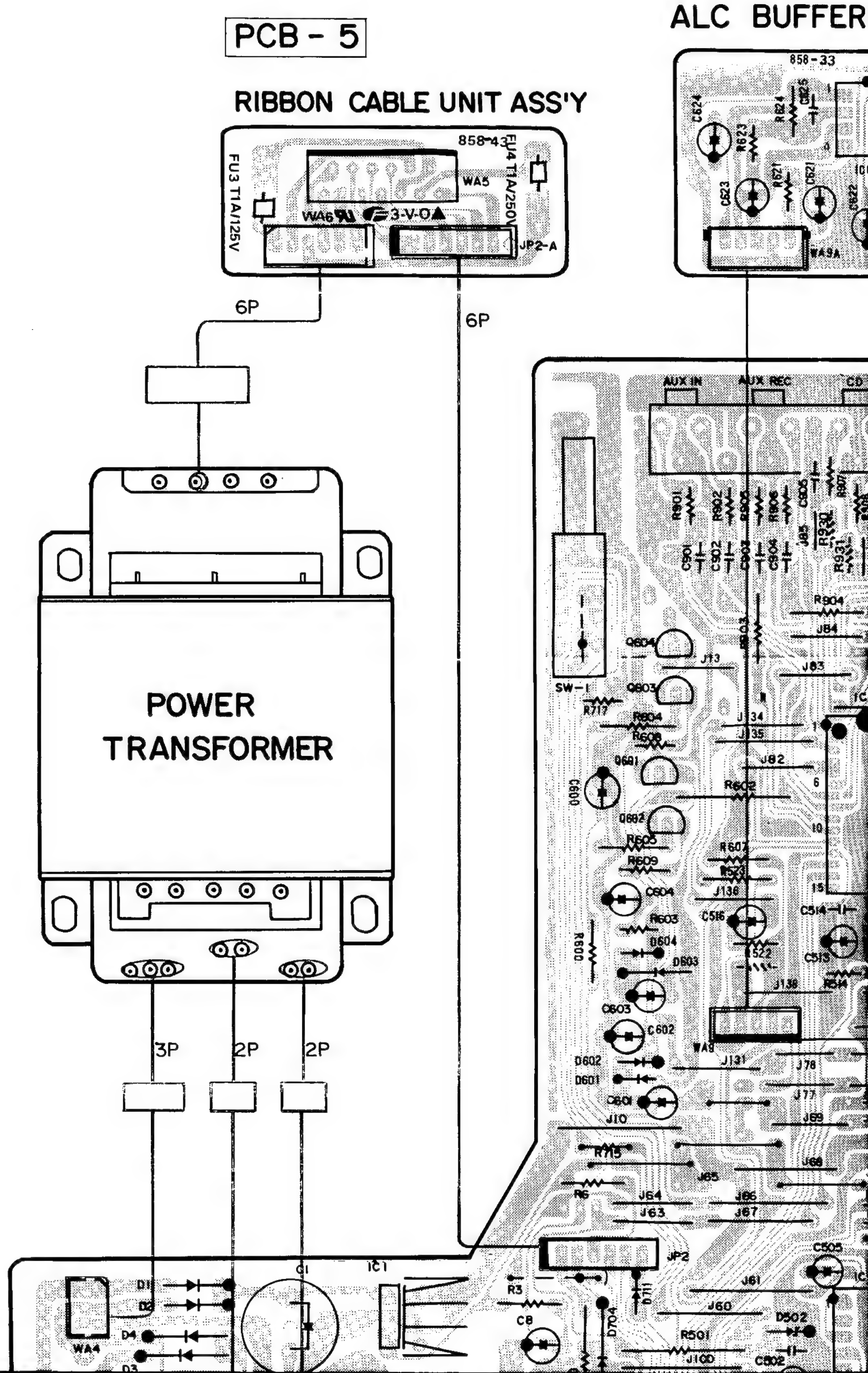
PCB - 2



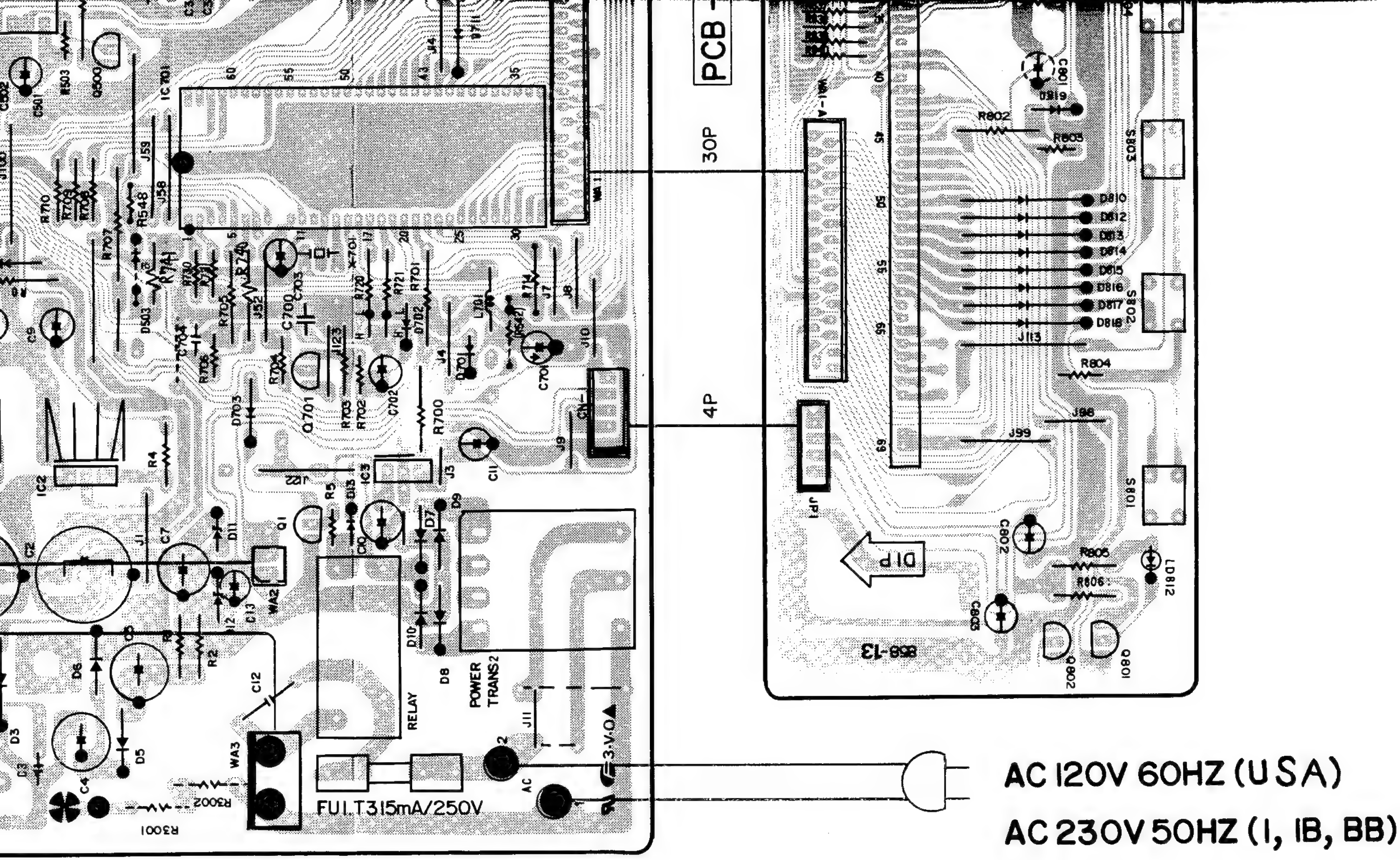
SCHEMATIC DIAGRAM (REMOTE CONTROL)





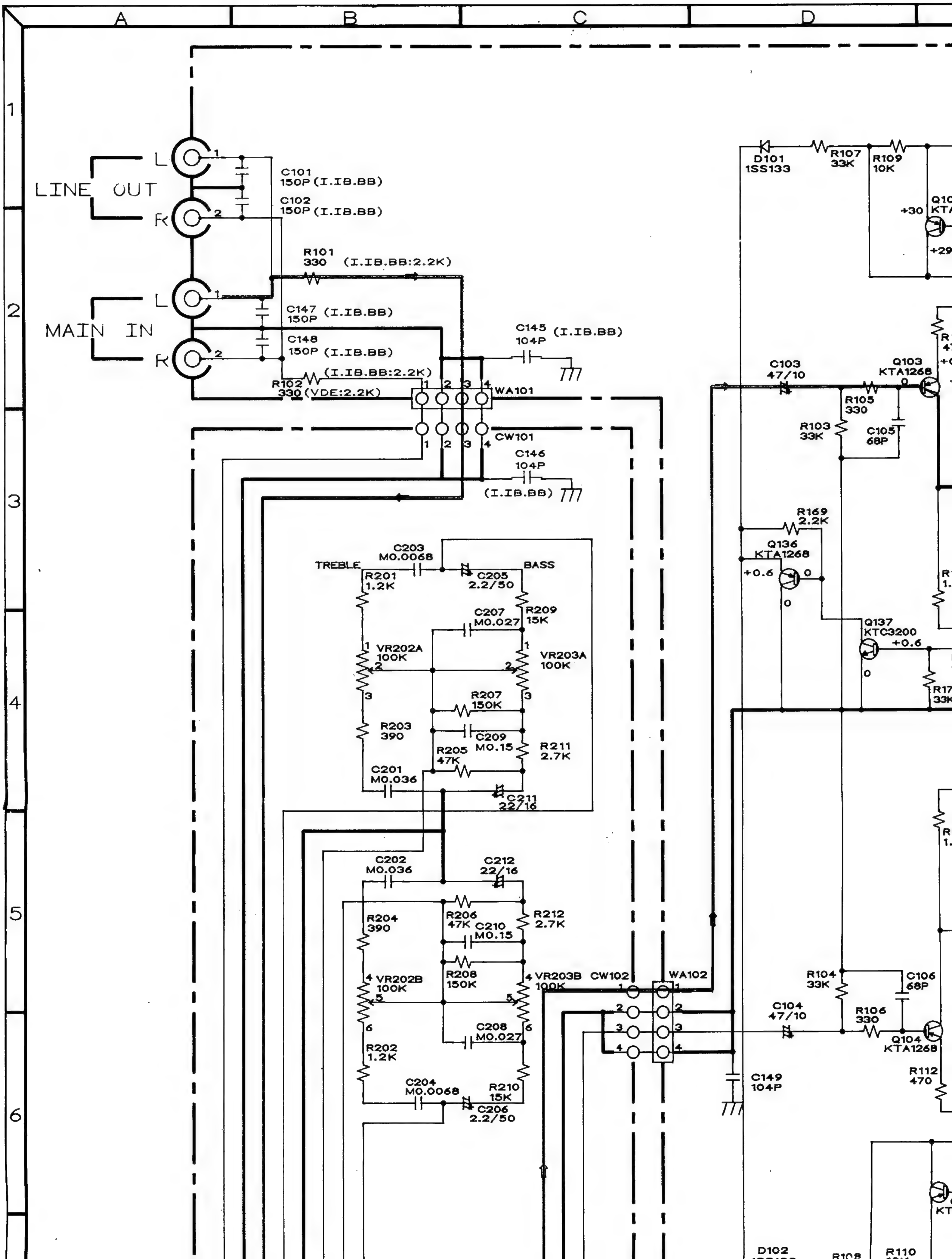


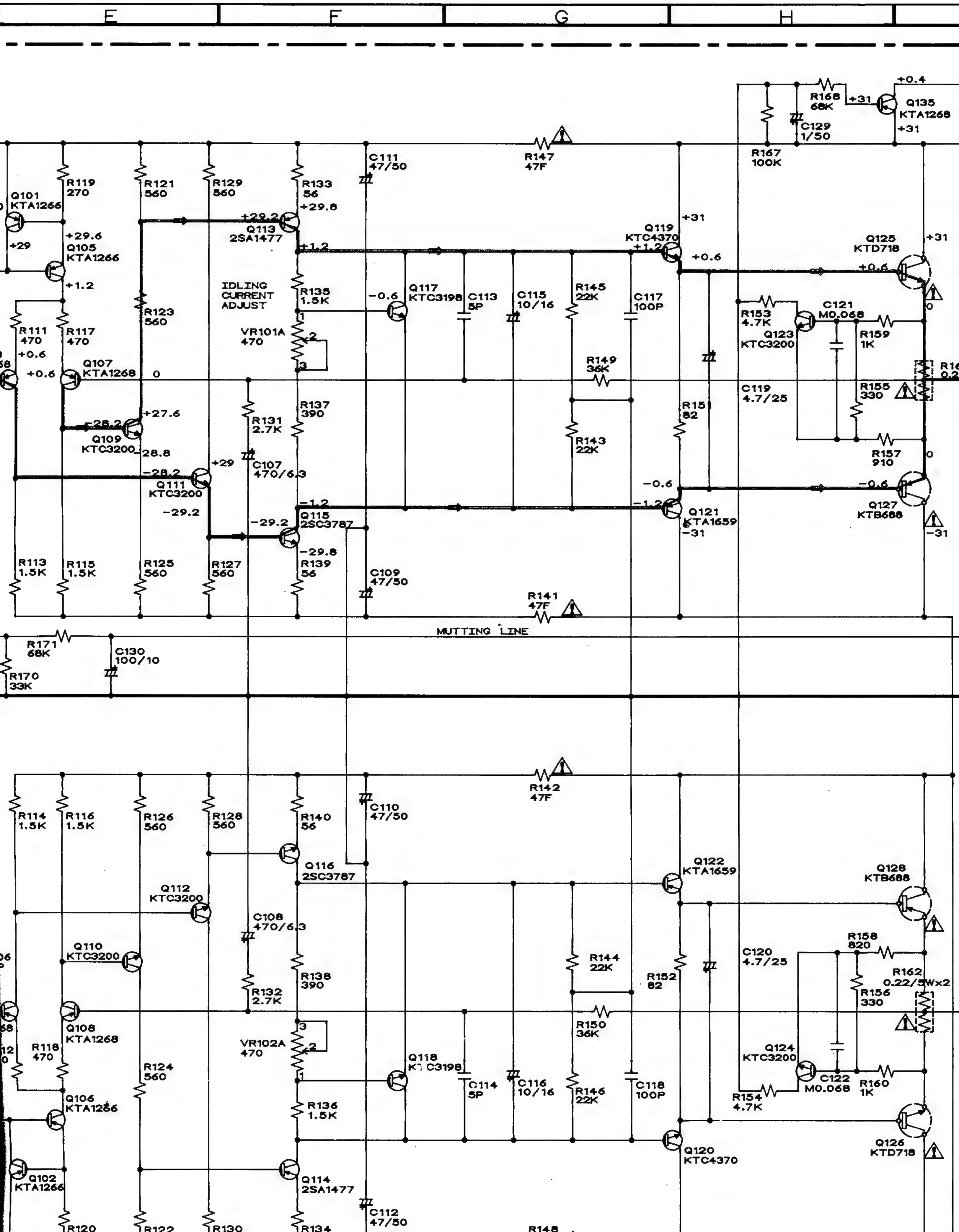
PCB - 5
RIBBON CABLE UNIT ASS'Y
ALC BUFFER
POWER
TRANSFORMER
6P
6P
3P
2P
2P
FU3 T1A/125V
FU4 T1A/250V
858-43
858-33
AUX IN
AUX REC



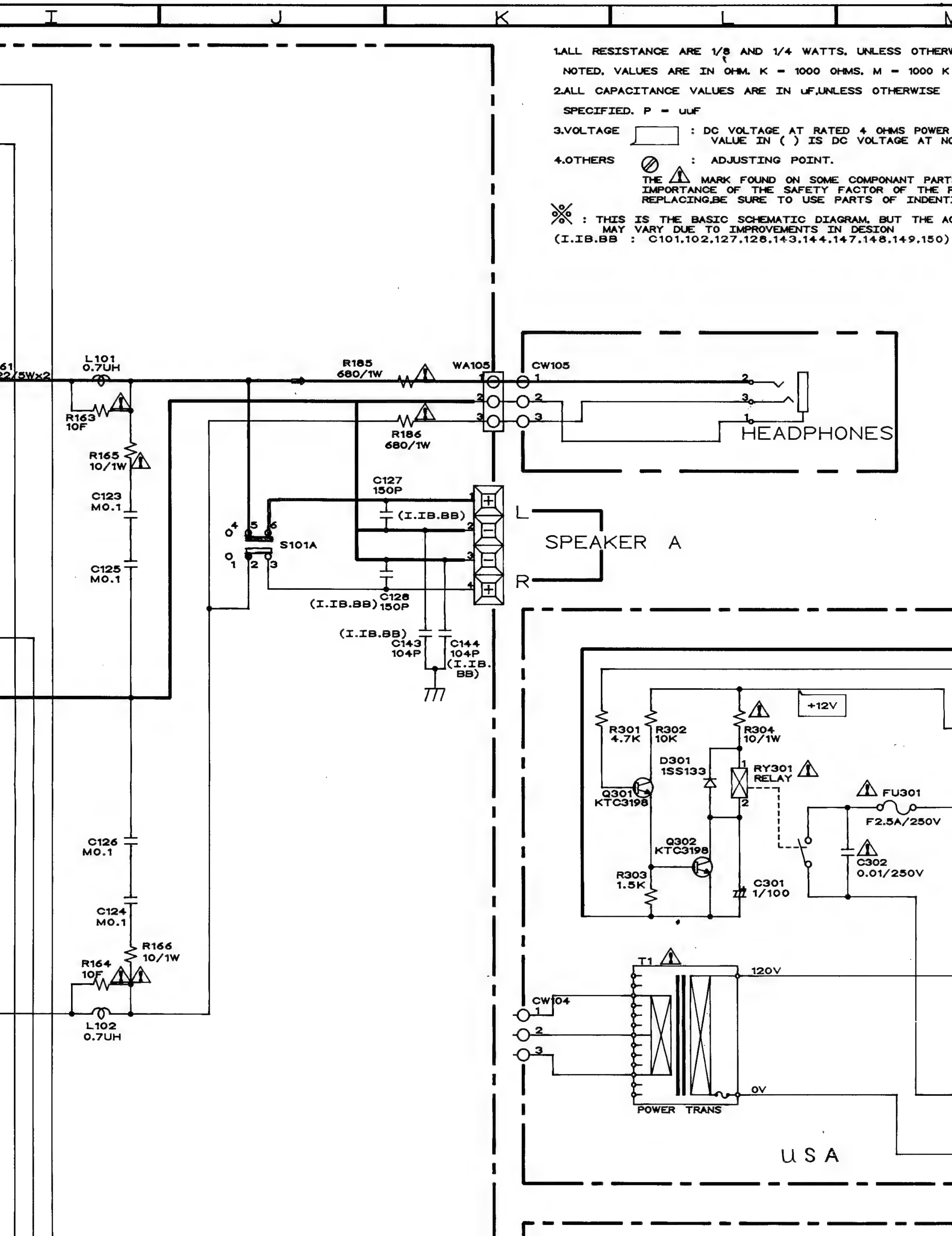
PCB
30P
4P
DIP
JP1
WA1-A
S801
S802
S803
LD812
Q801
Q802
C801
C802
C803
R802
R803
R804
R805
R806
D810
D812
D813
D814
D815
D816
D817
D818
D819
J113
J98
J99
IC701
CN-1
POWER TRANS2
RELAY
FU1 T315mA/250V
WA2
WA3
R3001
R3002
AC 120V 60HZ (USA)
AC 230V 50HZ (I, IB, BB)

SCHEMATIC DIAGRAM（A300）




E
F
G
H
R119 270
R121 560
R129 560
R133 56
C111 47/50
R147 47F
R168 68K
Q135 KTA1268
R167 100K
C129 1/50
Q101 KTA1266
Q105 KTA1266
Q113 2SA1477
Q119 KTC4370
Q125 KTD718
IDLING CURRENT ADJUST
R135 1.5K
Q117 KTC3198
C113 5P
C115 10/16
R145 22K
C117 100P
R153 4.7K
C121 M0.068
Q123 KTC3200
R159 1K
R111 470
R117 470
R123 560
VR101A 470
R149 36K
Q107 KTA1268
R137 390
C119 4.7/25
R155 330
R151 82
R131 2.7K
R143 22K
Q109 KTC3200
R157 910
C107 470/6.3
Q111 KTC3200
Q121 KTA1659
Q127 KTB688
Q115 2SC3787
R113 1.5K
R115 1.5K
R125 560
R127 560
R139 56
C109 47/50
R141 47F
MUTTING LINE
R171 68K
C130 100/10
R170 33K
R142 47F
R114 1.5K
R116 1.5K
R126 560
R128 560
R140 56
C110 47/50
Q116 2SC3787
Q122 KTA1659
Q128 KTB688
Q112 KTC3200
C108 470/6.3
R158 820
Q110 KTC3200
R144 22K
C120 4.7/25
R162 0.22/5Wx2
R138 390
R152 82
R156 330
R132 2.7K
R150 36K
Q108 KTA1268
R118 470
VR102A 470
Q118 KTC3198
Q124 KTC3200
R124 560
C114 5P
C116 10/16
R146 22K
C118 100P
C122 M0.068
R160 1K
R154 4.7K
R136 1.5K
Q106 KTA1266
Q126 KTD718
Q120 KTC4370
Q102 KTA1266
Q114 2SA1477
C112 47/50
R120
R122
R130
R134
R148

1.ALL RESISTANCE ARE 1/8 AND 1/4 WATTS, UNLESS OTHERW
NOTED, VALUES ARE IN OHM. K = 1000 OHMS, M = 1000 K
2.ALL CAPACITANCE VALUES ARE IN uF,UNLESS OTHERWISE
SPECIFIED. P = uuF
3.VOLTAGE : DC VOLTAGE AT RATED 4 OHMS POWER
VALUE IN ( ) IS DC VOLTAGE AT NO
4.OTHERS : ADJUSTING POINT.
THE MARK FOUND ON SOME COMPONANT PARTS
IMPORTANCE OF THE SAFETY FACTOR OF THE PA
REPLACING,BE SURE TO USE PARTS OF INDENTI
※ : THIS IS THE BASIC SCHEMATIC DIAGRAM, BUT THE AC
MAY VARY DUE TO IMPROVEMENTS IN DESION
(I.IB.BB : C101,102,127,128,143,144,147,148,149,150)



K L M N

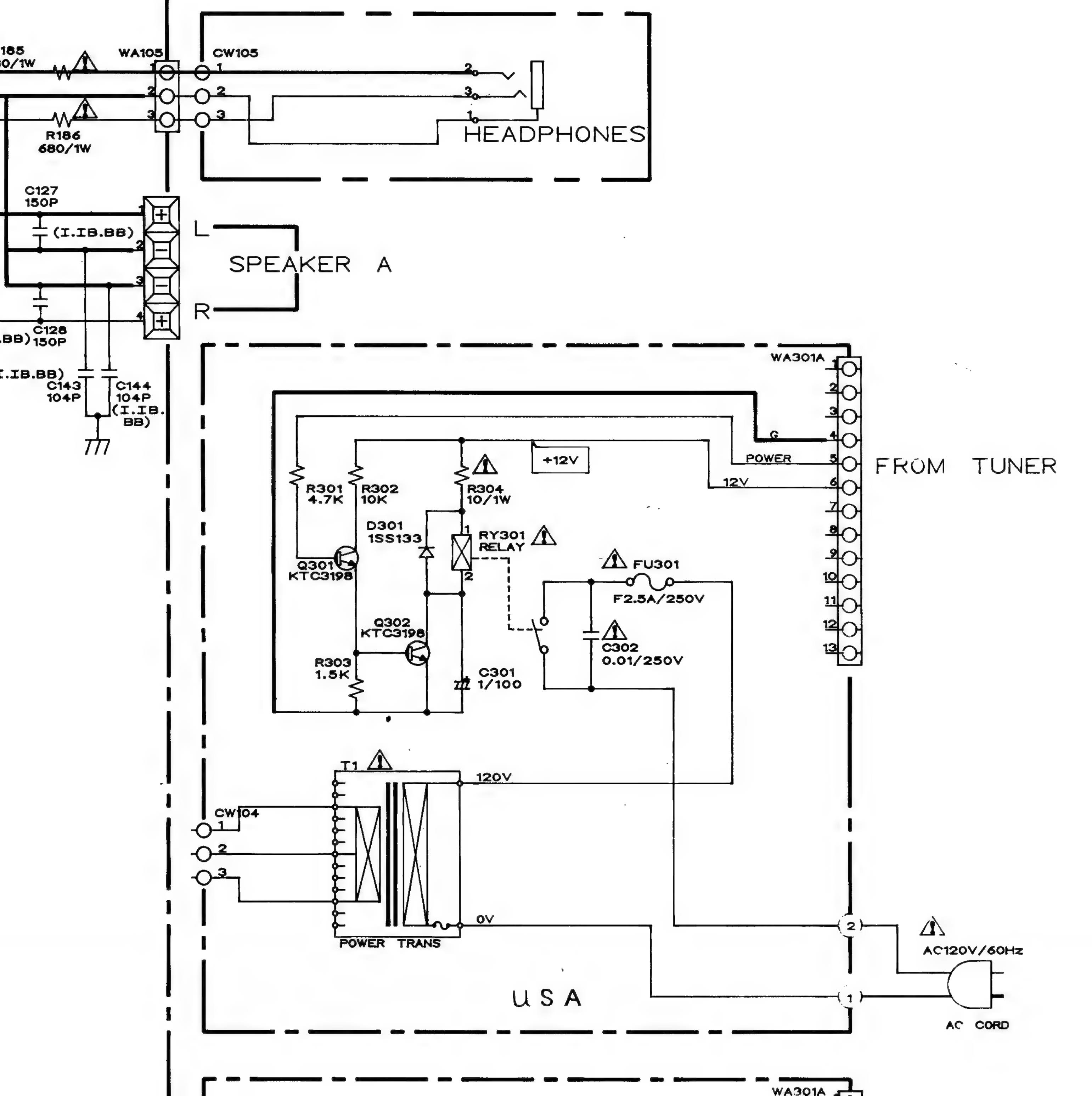
1.ALL RESISTANCE ARE 1/8 AND 1/4 WATTS, UNLESS OTHERWISE NOTED. VALUES ARE IN OHM. K = 1000 OHMS, M = 1000 K OHMS

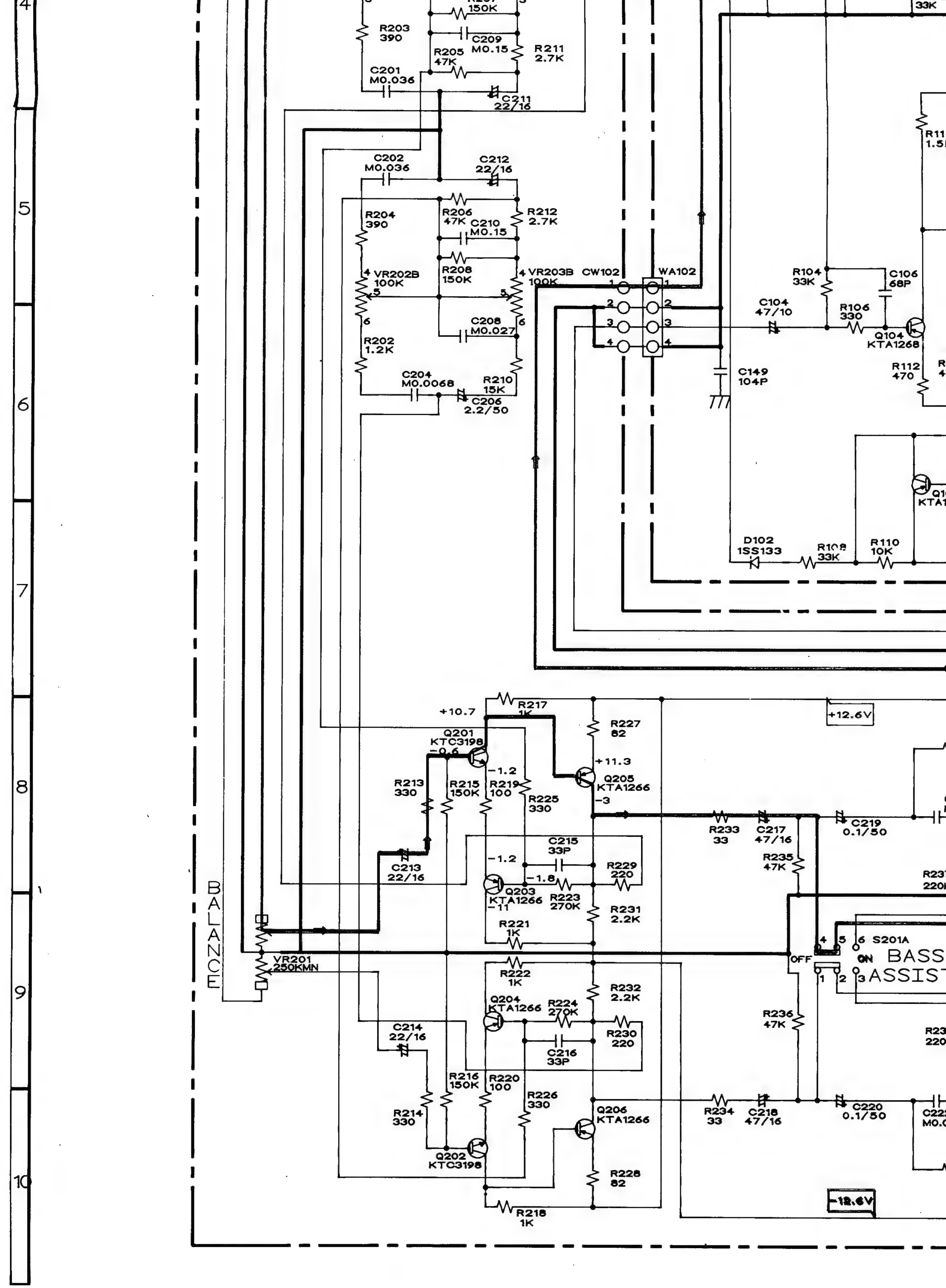
2.ALL CAPACITANCE VALUES ARE IN uF,UNLESS OTHERWISE SPECIFIED. P = uuF

3.VOLTAGE [ ] : DC VOLTAGE AT RATED 4 OHMS POWER
VALUE IN ( ) IS DC VOLTAGE AT NO INPUT SIGNAL

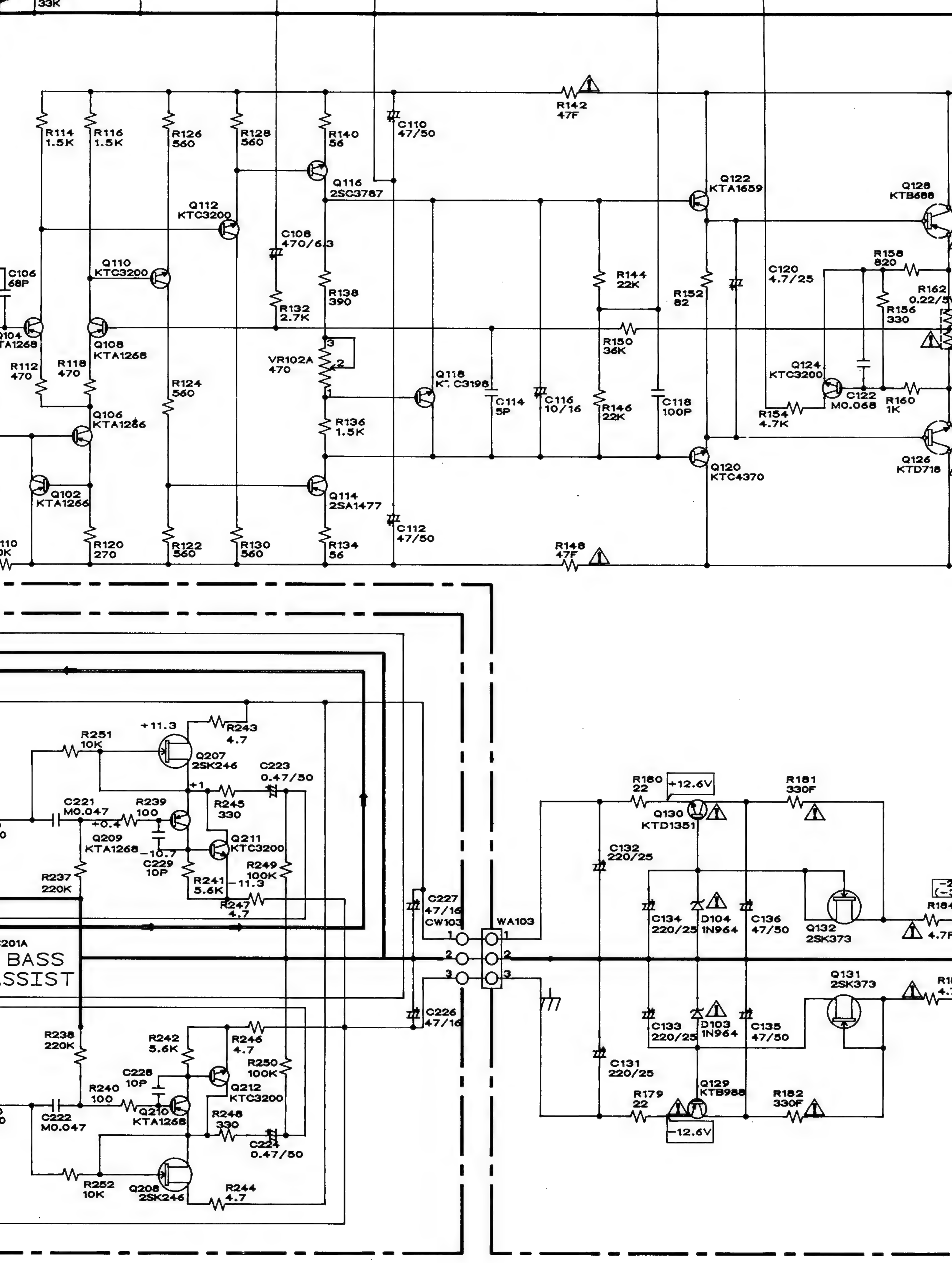
4.OTHERS ⊘ : ADJUSTING POINT.
THE ⚠ MARK FOUND ON SOME COMPONANT PARTS INDICATES THE IMPORTANCE OF THE SAFETY FACTOR OF THE PART. THEREFORE, WHEN REPLACING,BE SURE TO USE PARTS OF INDENTICAL DESIGNATION.

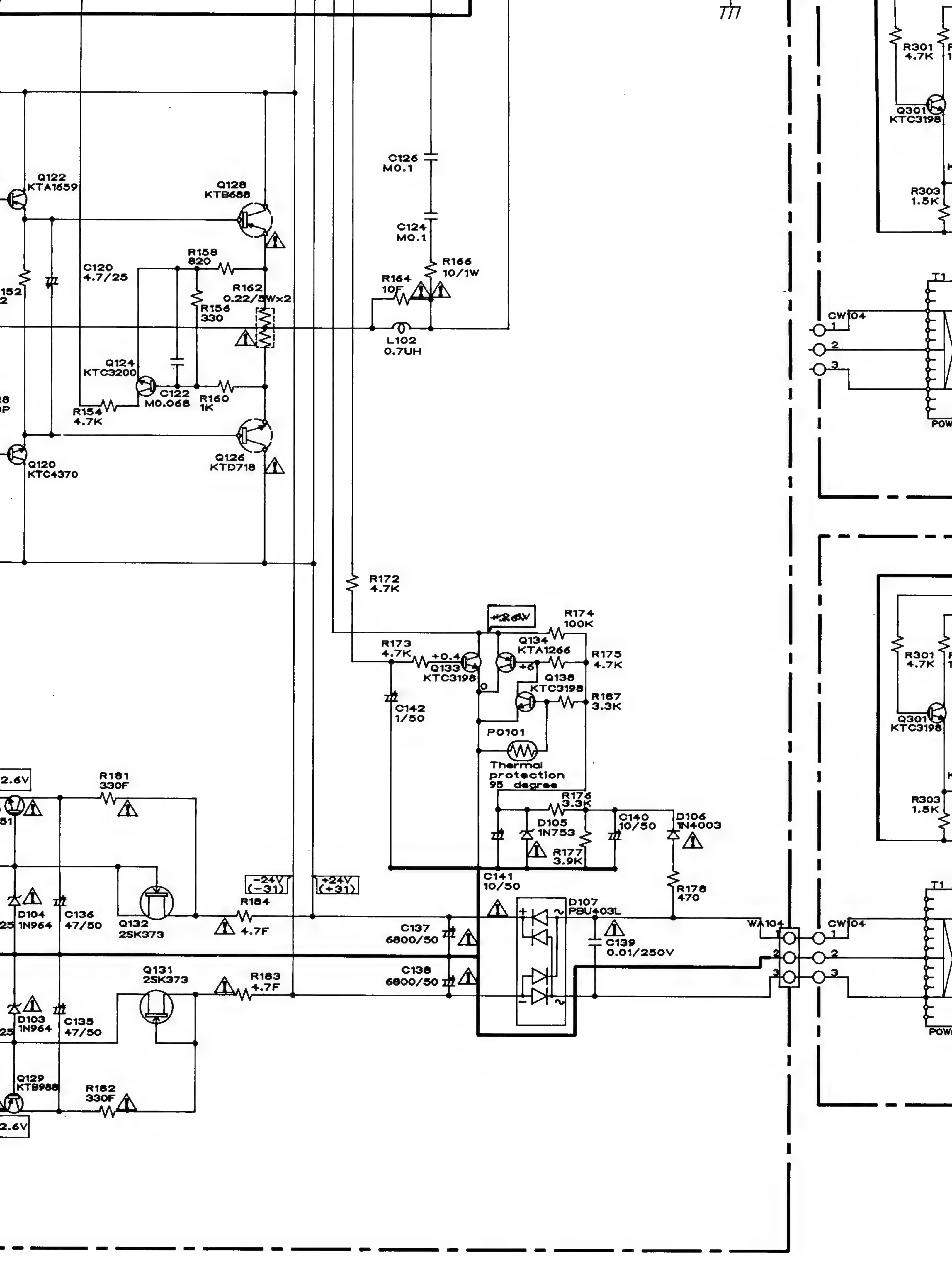
※ : THIS IS THE BASIC SCHEMATIC DIAGRAM, BUT THE ACTUAL CIRCUIT MAY VARY DUE TO IMPROVEMENTS IN DESION
(I.IB.BB : C101,102,127,128,143,144,147,148,149,150)



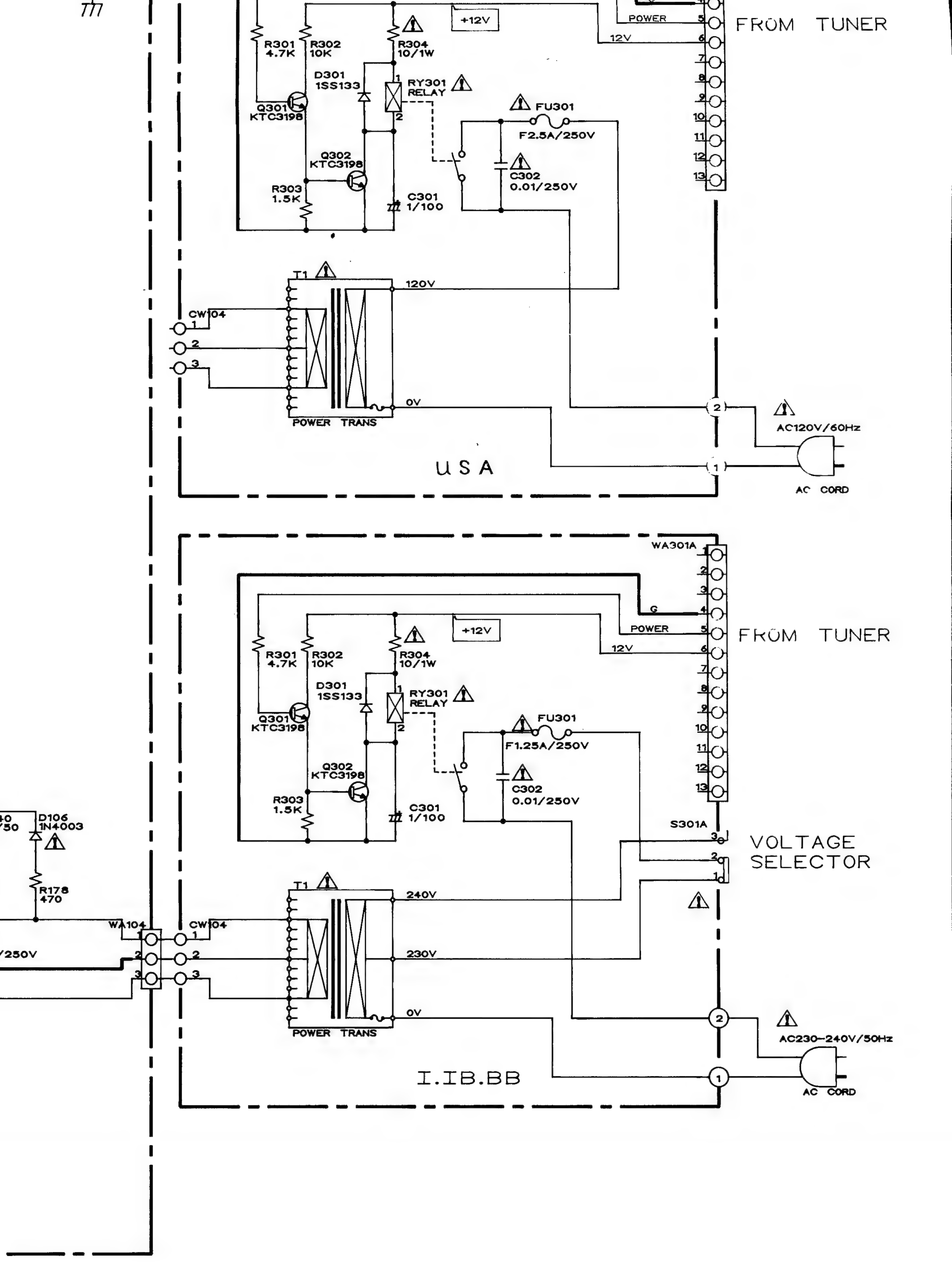


R203
390
R207
150K
C209
M0.15
R205
47K
R211
2.7K
C201
M0.036
C211
22/16
C202
M0.036
C212
22/16
R204
390
R206
47K
C210
M0.15
R212
2.7K
R208
150K
VR202B
100K
VR203B
100K
CW102
WA102
C208
M0.027
R202
1.2K
C204
M0.0068
R210
15K
C206
2.2/50
R104
33K
C106
68P
C104
47/10
R106
330
Q104
KTA1268
C149
104P
R112
470
D102
1SS133
R108
33K
R110
10K
+10.7
R217
1K
Q201
KTC3198
-0.6
R227
82
+12.6V
+11.3
Q205
KTA1266
-3
-1.2
R213
330
R215
150K
R219
100
R225
330
R233
33
C217
47/16
C219
0.1/50
C215
33P
R235
47K
C213
22/16
R229
220
-1.8
Q203
KTA1266
-11
R223
270K
R231
2.2K
BALANCE
R221
1K
S201A
OFF
ON
BASS
ASSIST
VR201
250KMN
R222
1K
R232
2.2K
Q204
KTA1266
R224
270K
R236
47K
C214
22/16
R230
220
C216
33P
R216
150K
R220
100
R226
330
R214
330
Q206
KTA1266
R234
33
C218
47/16
C220
0.1/50
Q202
KTC3198
R228
82
-12.6V
R218
1K


33K
R142
47F
R114
1.5K
R116
1.5K
R126
560
R128
560
R140
56
C110
47/50
Q116
2SC3787
Q122
KTA1659
Q128
KTB688
Q112
KTC3200
C108
470/6.3
R158
820
C106
68P
Q110
KTC3200
R144
22K
R152
82
C120
4.7/25
R162
0.22/5
R138
390
R132
2.7K
R156
330
Q104
KTA1268
Q108
KTA1268
R150
36K
VR102A
470
R112
470
R118
470
Q124
KTC3200
R124
560
Q118
KTC3198
C114
5P
C116
10/16
R146
22K
C118
100P
C122
M0.068
R160
1K
Q106
KTA1266
R136
1.5K
R154
4.7K
Q126
KTD718
Q120
KTC4370
Q102
KTA1266
Q114
2SA1477
C112
47/50
R148
47F
R120
270
R122
560
R130
560
R134
56
+11.3
R243
4.7
R251
10K
Q207
2SK246
C223
0.47/50
+1
R245
330
C221
M0.047
R239
100
+0.4
Q209
KTA1268
-10.7
C229
10P
Q211
KTC3200
R249
100K
R237
220K
R241
5.6K
-11.3
R247
4.7
C227
47/16
CW103
WA103
BASS
ASSIST
R180
22
+12.6V
R181
330F
Q130
KTD1351
C132
220/25
C134
220/25
D104
1N964
C136
47/50
Q132
2SK373
R184
4.7F
Q131
2SK373
C226
47/16
R238
220K
R242
5.6K
R246
4.7
R250
100K
C228
10P
Q212
KTC3200
R240
100
Q210
KTA1268
C222
M0.047
R248
330
C224
0.47/50
R252
10K
Q208
2SK246
R244
4.7
C133
220/25
D103
1N964
C135
47/50
C131
220/25
Q129
KTB988
R179
22
R182
330F
-12.6V

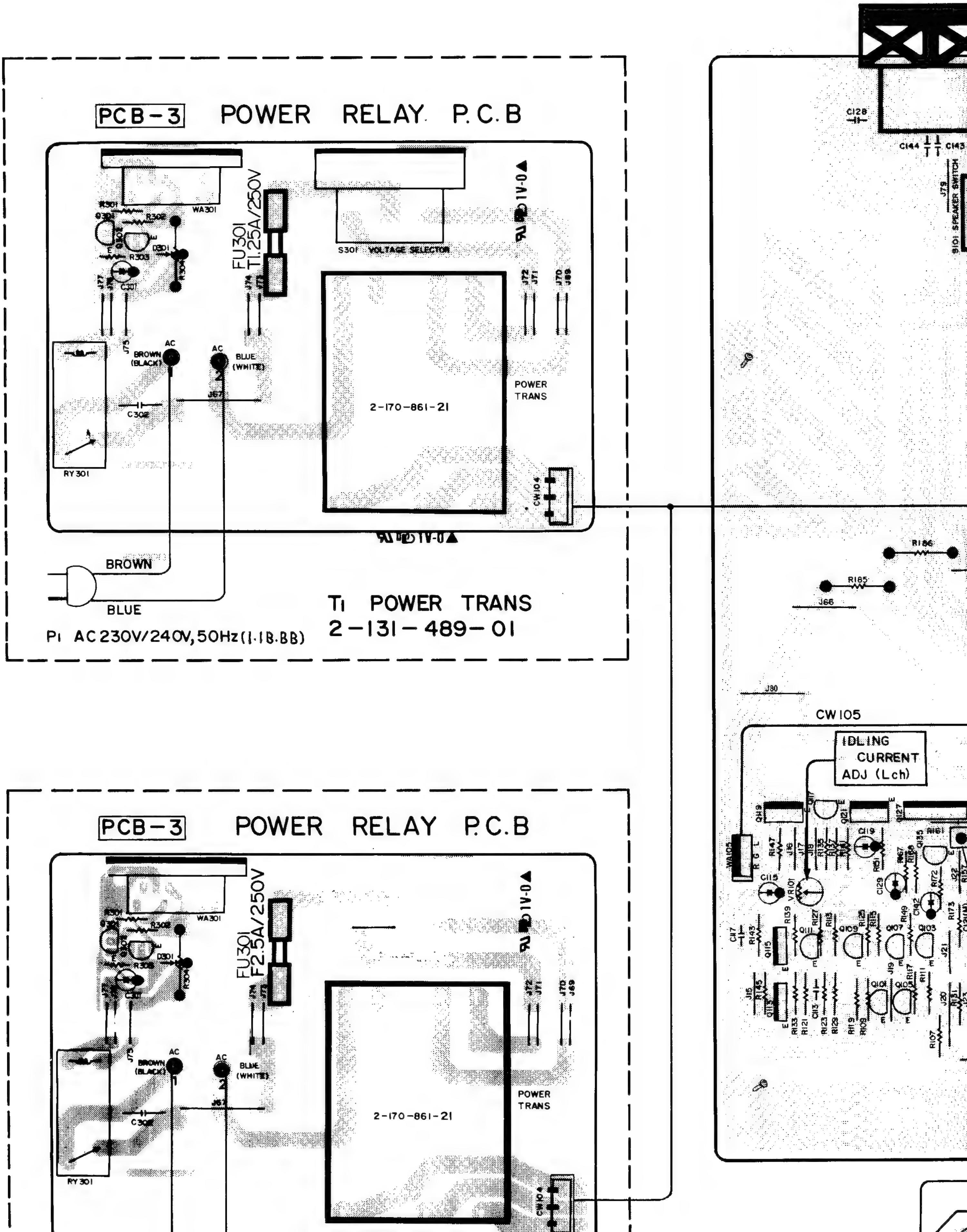


R301
4.7K
Q301
KTC3198
R303
1.5K
T1
CW104
1
2
3
POW
C126
M0.1
C124
M0.1
R166
10/1W
R164
10F
L102
0.7UH
Q122
KTA1659
Q128
KTB688
R158
820
C120
4.7/25
R162
0.22/5Wx2
R156
330
Q124
KTC3200
C122
M0.068
R160
1K
R154
4.7K
Q120
KTC4370
Q126
KTD718
R172
4.7K
+26V
R174
100K
R173
4.7K
+0.4
Q133
KTC3198
Q134
KTA1266
+6
R175
4.7K
Q138
KTC3198
R187
3.3K
C142
1/50
P0101
Thermal
protection
95 degree
R176
3.3K
D105
1N753
R177
3.9K
C140
10/50
D106
1N4003
R178
470
C141
10/50
D107
PBU403L
C139
0.01/250V
WA104
1
2
3
C137
6800/50
C138
6800/50
-24V
(-31)
+24V
(+31)
R184
4.7F
R183
4.7F
R181
330F
2.6V
D104
1N964
C136
47/50
Q132
2SK373
Q131
2SK373
D103
1N964
C135
47/50
Q129
KTB988
R182
330F
2.6V

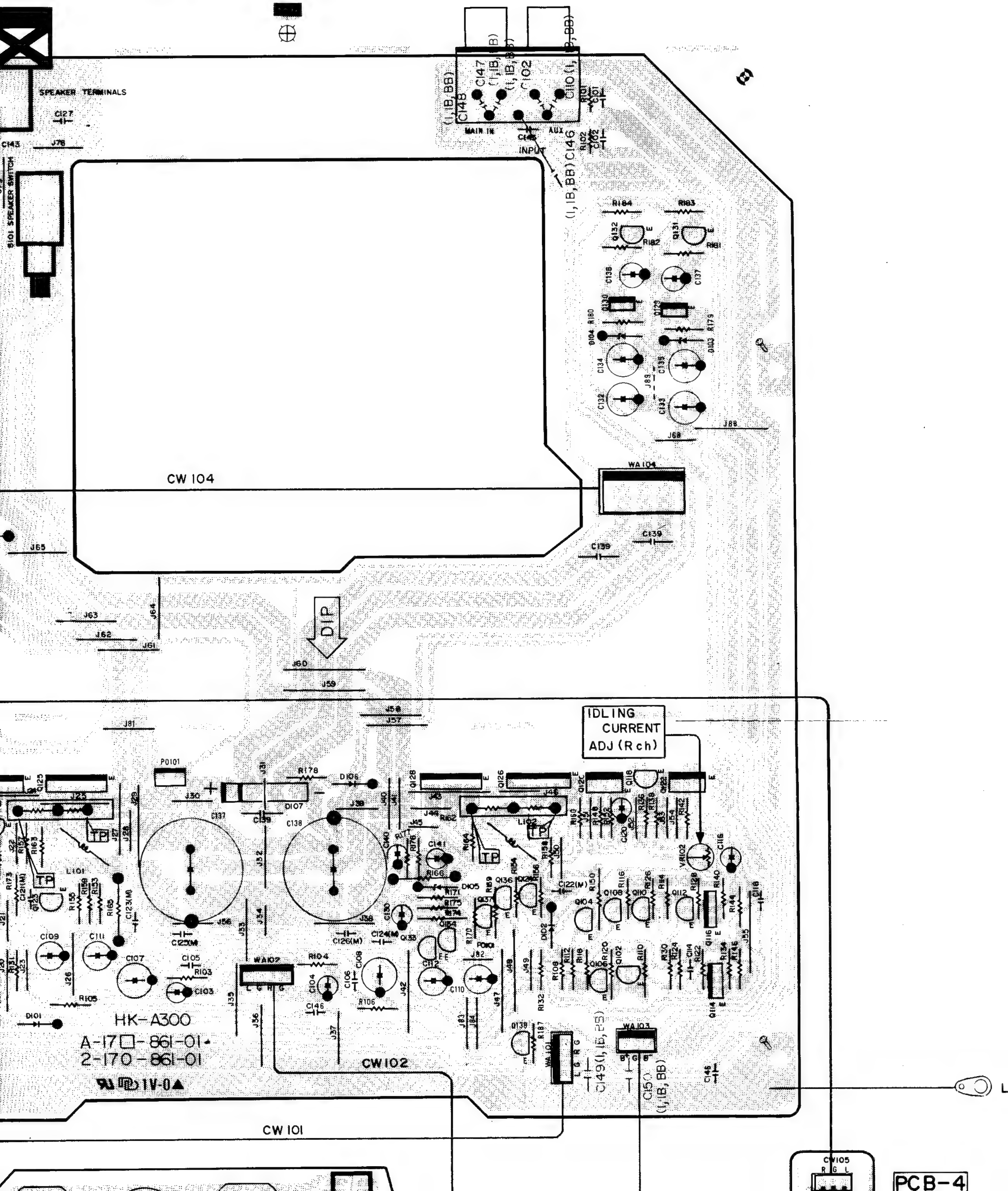


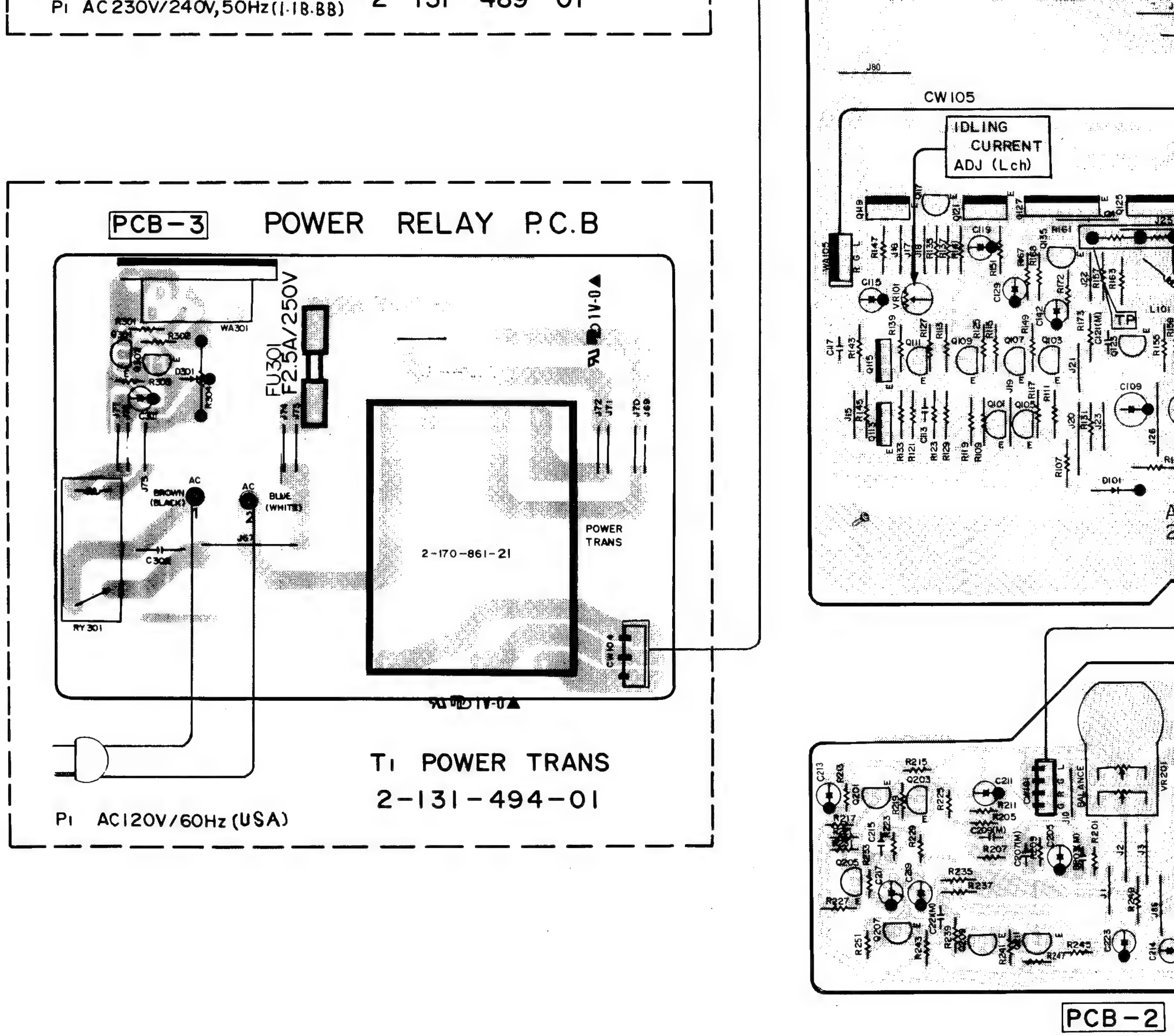
FROM TUNER
POWER
12V
+12V
R301 4.7K
R302 10K
R304 10/1W
D301 1SS133
RY301 RELAY
Q301 KTC3198
Q302 KTC3198
R303 1.5K
C301 1/100
FU301
F2.5A/250V
C302 0.01/250V
T1
120V
0V
CW104
POWER TRANS
AC120V/60Hz
AC CORD
USA
WA301A
G
POWER
12V
+12V
FROM TUNER
R301 4.7K
R302 10K
R304 10/1W
D301 1SS133
RY301 RELAY
Q301 KTC3198
Q302 KTC3198
R303 1.5K
C301 1/100
FU301
F1.25A/250V
C302 0.01/250V
S301A
VOLTAGE SELECTOR
D106 1N4003
R178 470
/250V
WA104
CW104
T1
240V
230V
0V
POWER TRANS
AC230-240V/50Hz
AC CORD
I.IB.BB

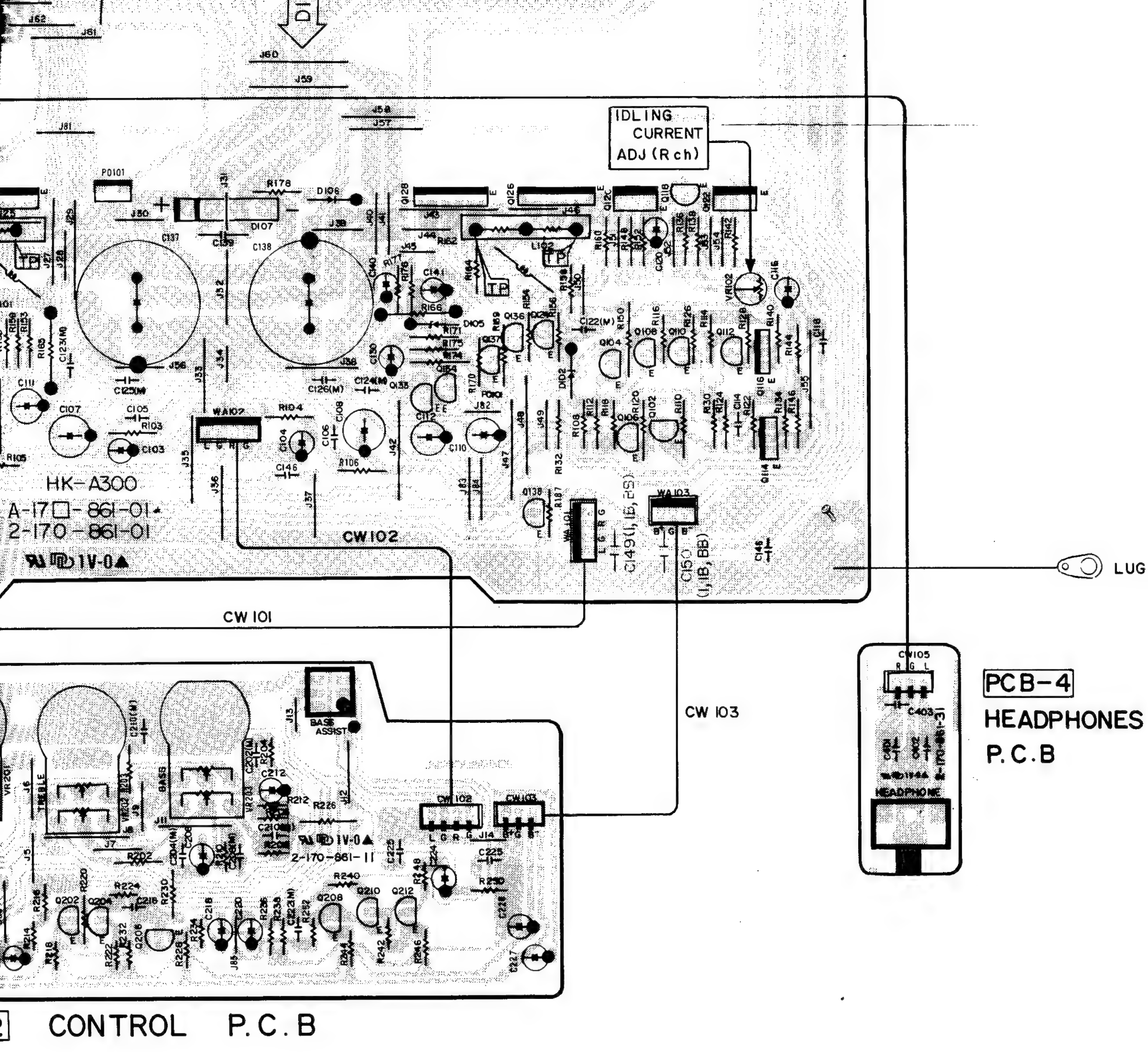
A-300


PCB-3 POWER RELAY P.C.B
FU301 T1.25A/250V
S301 VOLTAGE SELECTOR
WA301
RY301
BROWN (BLACK)
BLUE (WHITE)
POWER TRANS
2-170-861-21
CW104
BROWN
BLUE
T1 POWER TRANS
2-131-489-01
P1 AC230V/240V,50Hz(1.1B.BB)
S101 SPEAKER SWITCH
CW105
IDLING CURRENT ADJ (Lch)
WA105
VR101
PCB-3 POWER RELAY P.C.B
FU301 F2.5A/250V
WA301
RY301
POWER TRANS
2-170-861-21
CW104

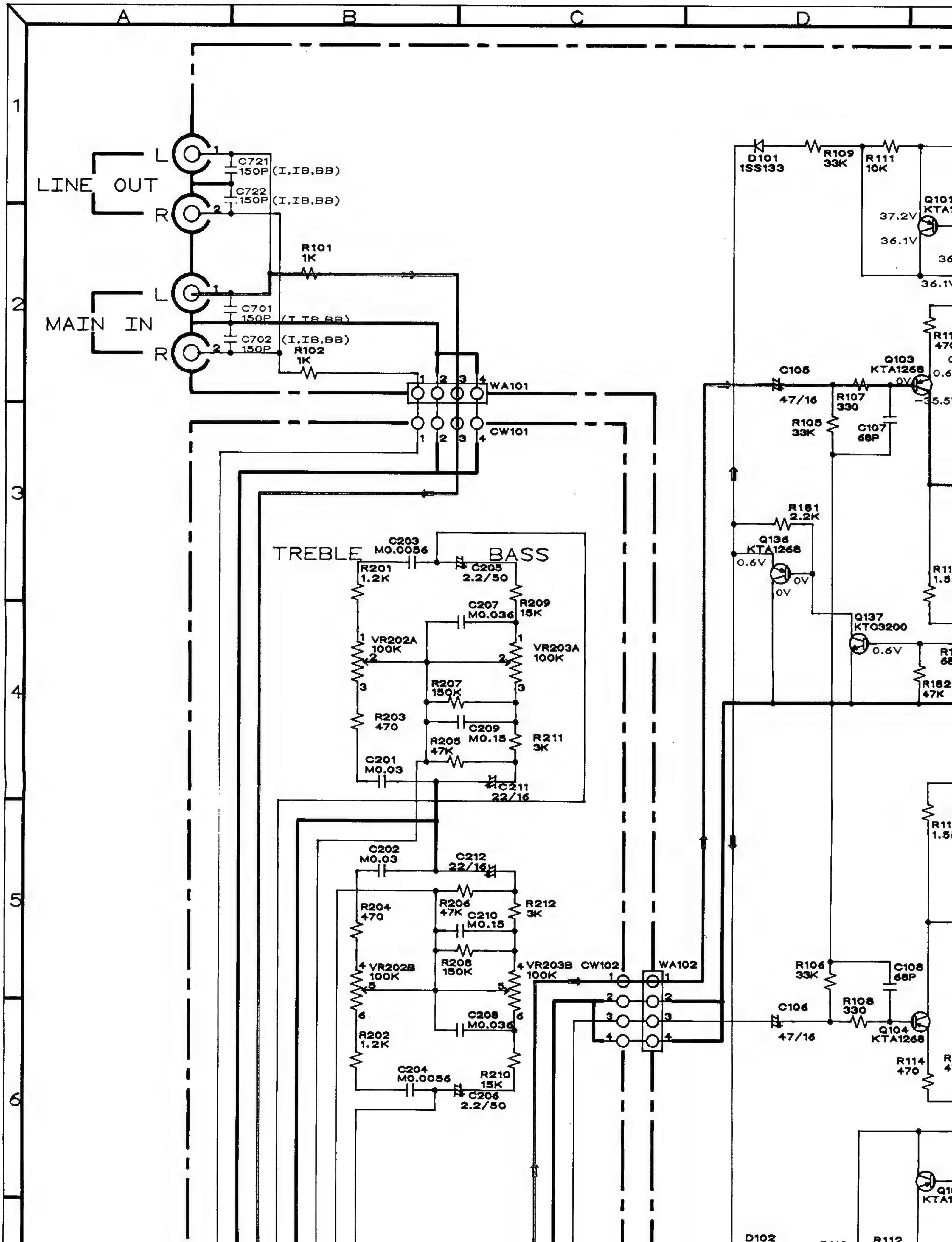
PCB-1 MAIN P.C.B

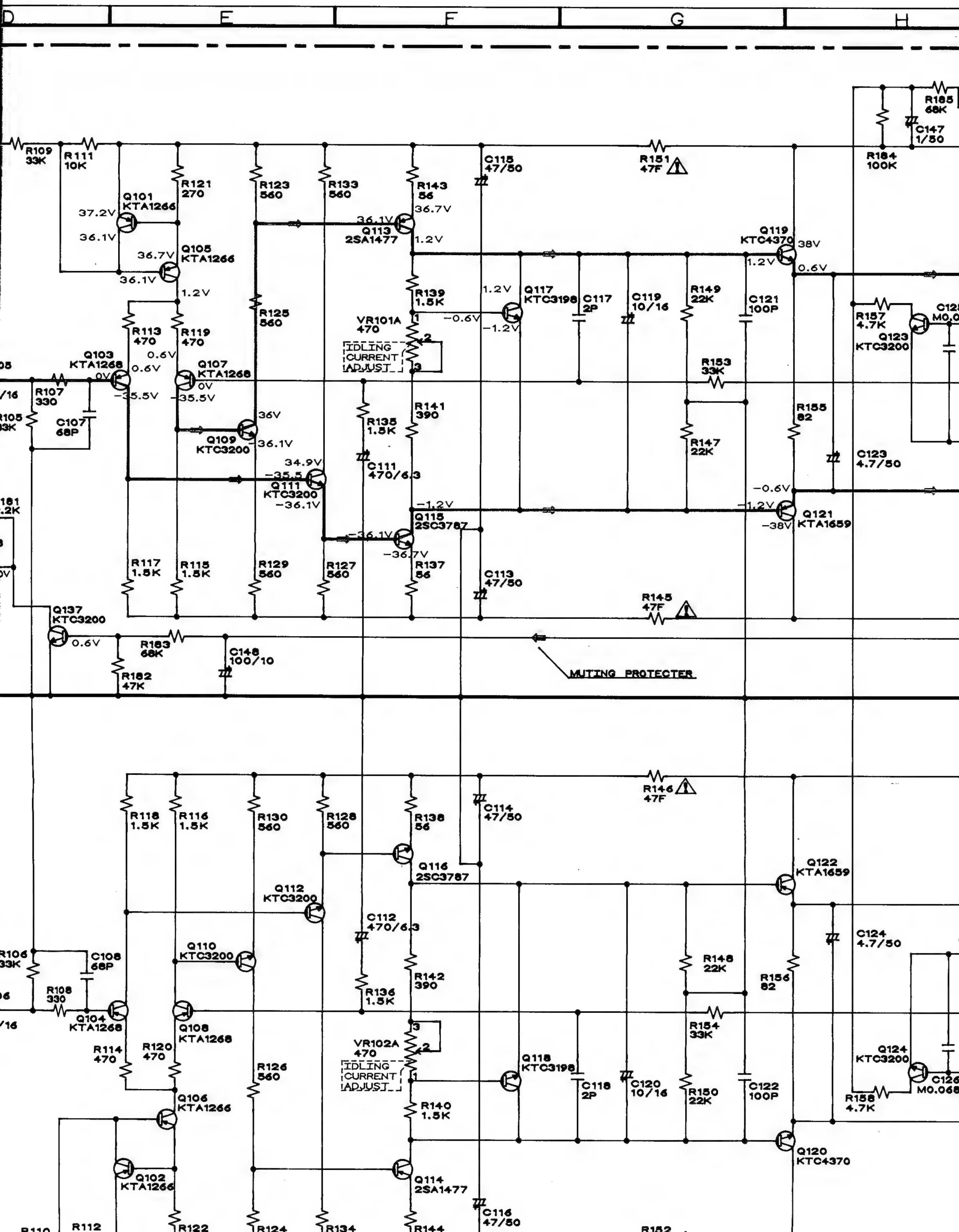



P1 AC230V/240V,50Hz(1.1B.BB)
PCB-3 POWER RELAY P.C.B
FU301 F2.5A/250V
WA301
RY301
BROWN (BLACK)
BLUE (WHITE)
AC
POWER TRANS
2-170-861-21
CW104
T1 POWER TRANS
2-131-494-01
P1 AC120V/60Hz (USA)
CW105
IDLING CURRENT ADJ (Lch)
TP
BALANCE
PCB-2

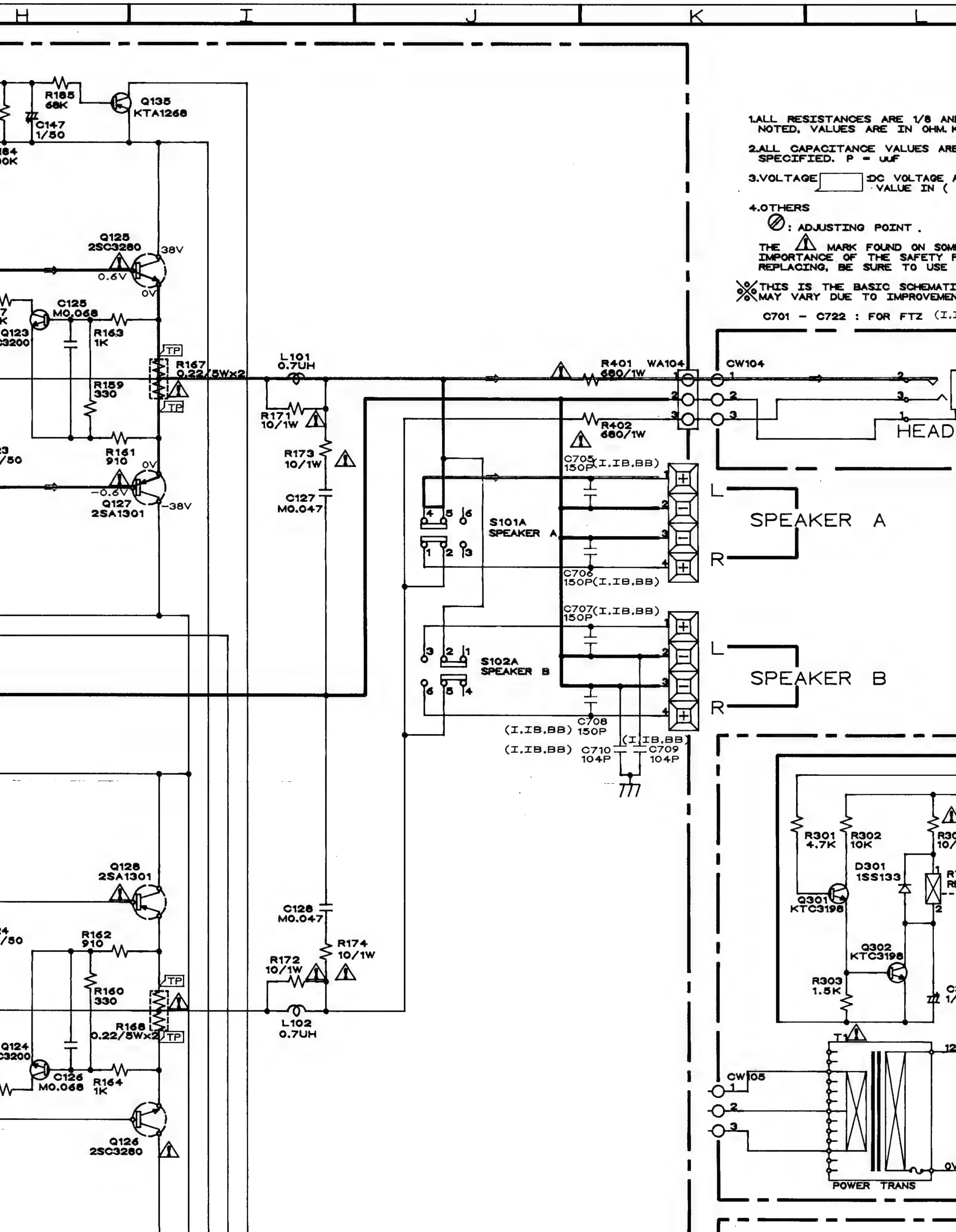

IDLING CURRENT ADJ (Rch)
HK-A300
A-17□-861-01
2-170-861-01
CW102
CW 101
LUG
CW 103
PCB-4
HEADPHONES
P.C.B
HEADPHONE
BASS ASSIST
TREBLE
BASS
2-170-861-11
CONTROL P.C.B

SCHEMATIC DIAGRAM (A500)





D
E
F
G
H
R109 33K
R111 10K
R121 270
R123 560
R133 560
R143 56
C115 47/50
R151 47F
R185 68K
C147 1/50
R184 100K
Q101 KTA1266
Q105 KTA1266
Q113 2SA1477
Q119 KTC4370
R139 1.5K
Q117 KTC3198
C117 2P
C119 10/16
R149 22K
C121 100P
R157 4.7K
Q123 KTC3200
R113 470
R119 470
R125 560
VR101A 470
IDLING CURRENT ADJUST
Q103 KTA1268
Q107 KTA1268
R153 33K
R107 330
C107 68P
Q109 KTC3200
R135 1.5K
R141 390
R155 82
R147 22K
C111 470/6.3
C123 4.7/50
Q111 KTC3200
Q115 2SC3787
Q121 KTA1659
R117 1.5K
R115 1.5K
R129 560
R127 560
R137 56
C113 47/50
R145 47F
Q137 KTC3200
R183 68K
R182 47K
C148 100/10
MUTING PROTECTER
R118 1.5K
R116 1.5K
R130 560
R128 560
R138 56
C114 47/50
R146 47F
Q116 2SC3787
Q122 KTA1659
Q112 KTC3200
C112 470/6.3
C124 4.7/50
Q110 KTC3200
R142 390
R148 22K
R156 82
C108 68P
R108 330
R136 1.5K
Q104 KTA1268
Q108 KTA1268
R154 33K
R114 470
R120 470
VR102A 470
IDLING CURRENT ADJUST
Q118 KTC3198
C118 2P
C120 10/16
R150 22K
C122 100P
Q124 KTC3200
R158 4.7K
R126 560
R140 1.5K
Q106 KTA1266
Q120 KTC4370
Q102 KTA1266
Q114 2SA1477
C116 47/50
R110
R112
R122
R124
R134
R144
R152


H
I
J
K
L
1.ALL RESISTANCES ARE 1/8 AN
NOTED, VALUES ARE IN OHM, K
2.ALL CAPACITANCE VALUES ARE
SPECIFIED. P = uuF
3.VOLTAGE :DC VOLTAGE
VALUE IN (
4.OTHERS
: ADJUSTING POINT .
THE MARK FOUND ON SOM
IMPORTANCE OF THE SAFETY F
REPLACING, BE SURE TO USE
THIS IS THE BASIC SCHEMATI
MAY VARY DUE TO IMPROVEMEN
C701 - C722 : FOR FTZ (I.
R185 68K
Q135 KTA1268
C147 1/50
Q125 2SC3280
38V
0.6V
0V
C125 M0.068
R163 1K
Q123
TP
R167 0.22/5Wx2
R159 330
R161 910
Q127 2SA1301
-0.6V
-38V
L101 0.7UH
R171 10/1W
R173 10/1W
C127 M0.047
R401 680/1W
WA104
CW104
R402 680/1W
HEAD
C705 150P (I.IB.BB)
S101A SPEAKER A
C706 150P (I.IB.BB)
SPEAKER A
C707 (I.IB.BB) 150P
S102A SPEAKER B
SPEAKER B
C708 (I.IB.BB) 150P
(I.IB.BB) C710 104P
(I.IB.BB) C709 104P
L
R
R301 4.7K
R302 10K
D301 1SS133
Q301 KTC3198
Q302 KTC3198
R303 1.5K
Q128 2SA1301
C128 M0.047
R174 10/1W
R172 10/1W
R162 910
R160 330
R168 0.22/5Wx2
L102 0.7UH
Q124
C126 M0.068
R164 1K
Q126 2SC3280
CW105
POWER TRANS

K L M N

1.ALL RESISTANCES ARE 1/8 AND 1/4 WATTS, UNLESS OTHERWISE NOTED, VALUES ARE IN OHM. K = 1000 OHMS, M = 1000 K OHMS

2.ALL CAPACITANCE VALUES ARE IN uF,UNLESS OTHERWISE SPECIFIED. P = uuF

3.VOLTAGE ☐ :DC VOLTAGE AT RATED 4 OHMS POWER VALUE IN ( ) IS DC VOLTAGE AT NO INPUT SIGNAL

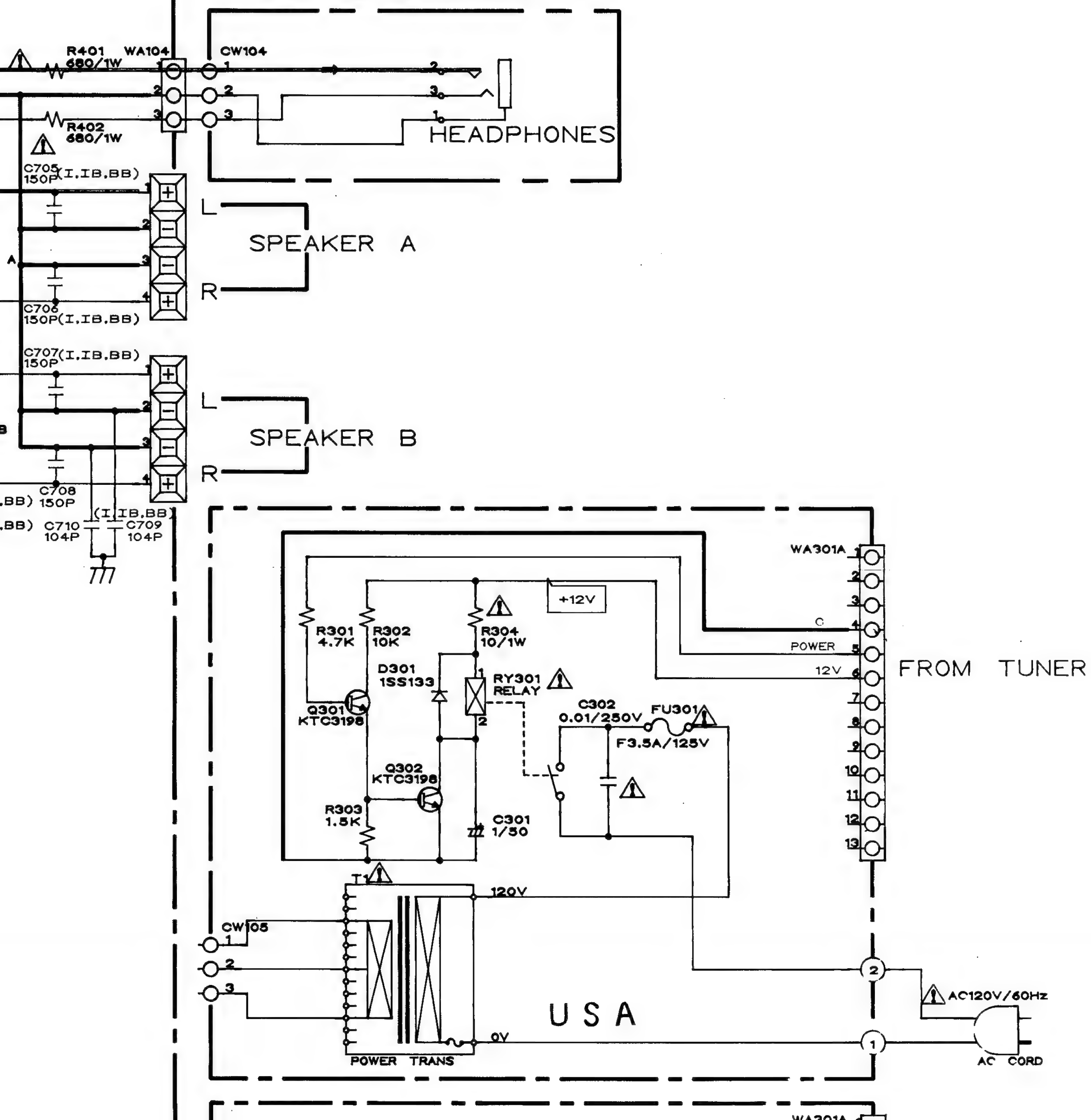
4.OTHERS

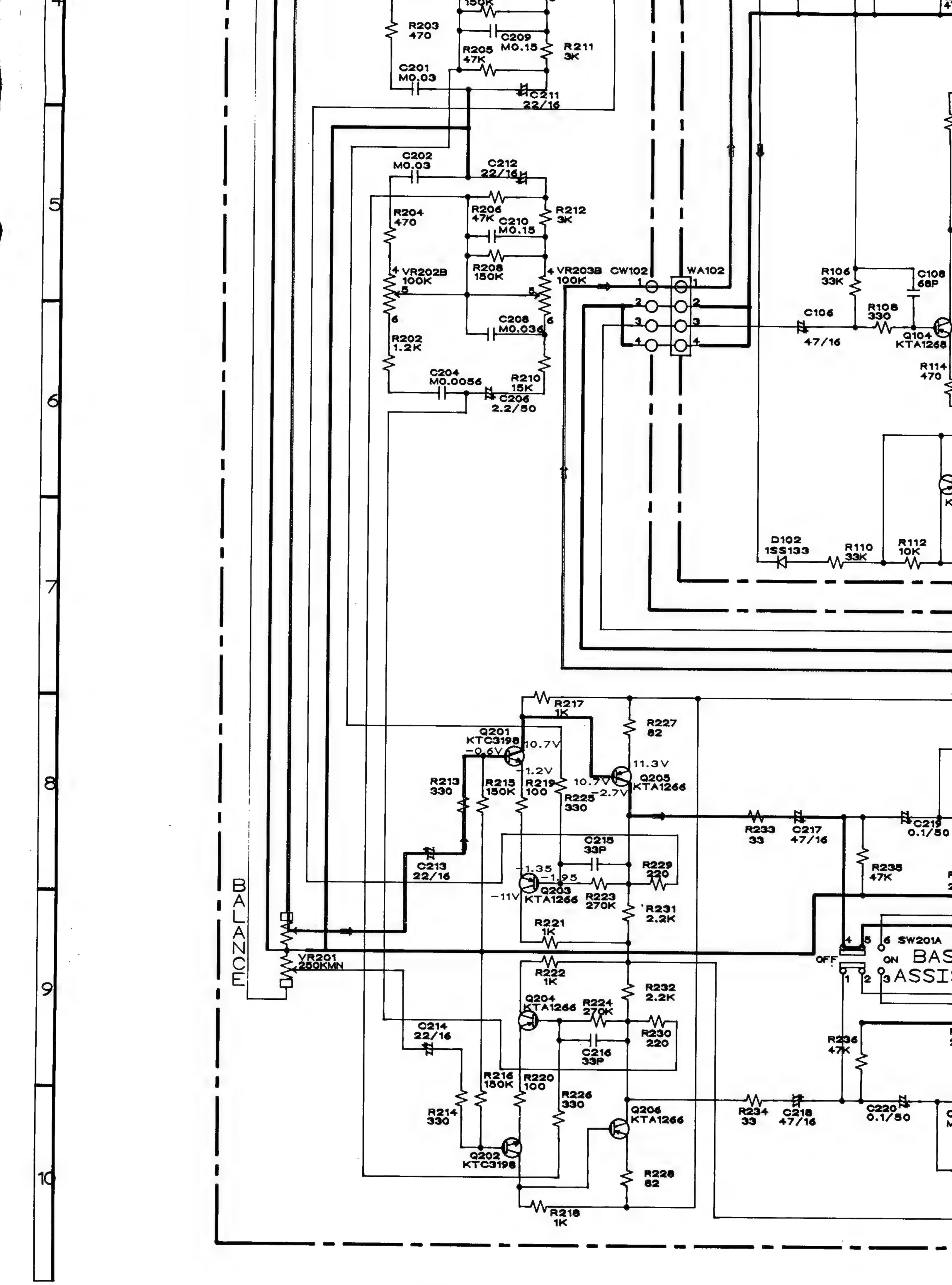
⊘: ADJUSTING POINT .

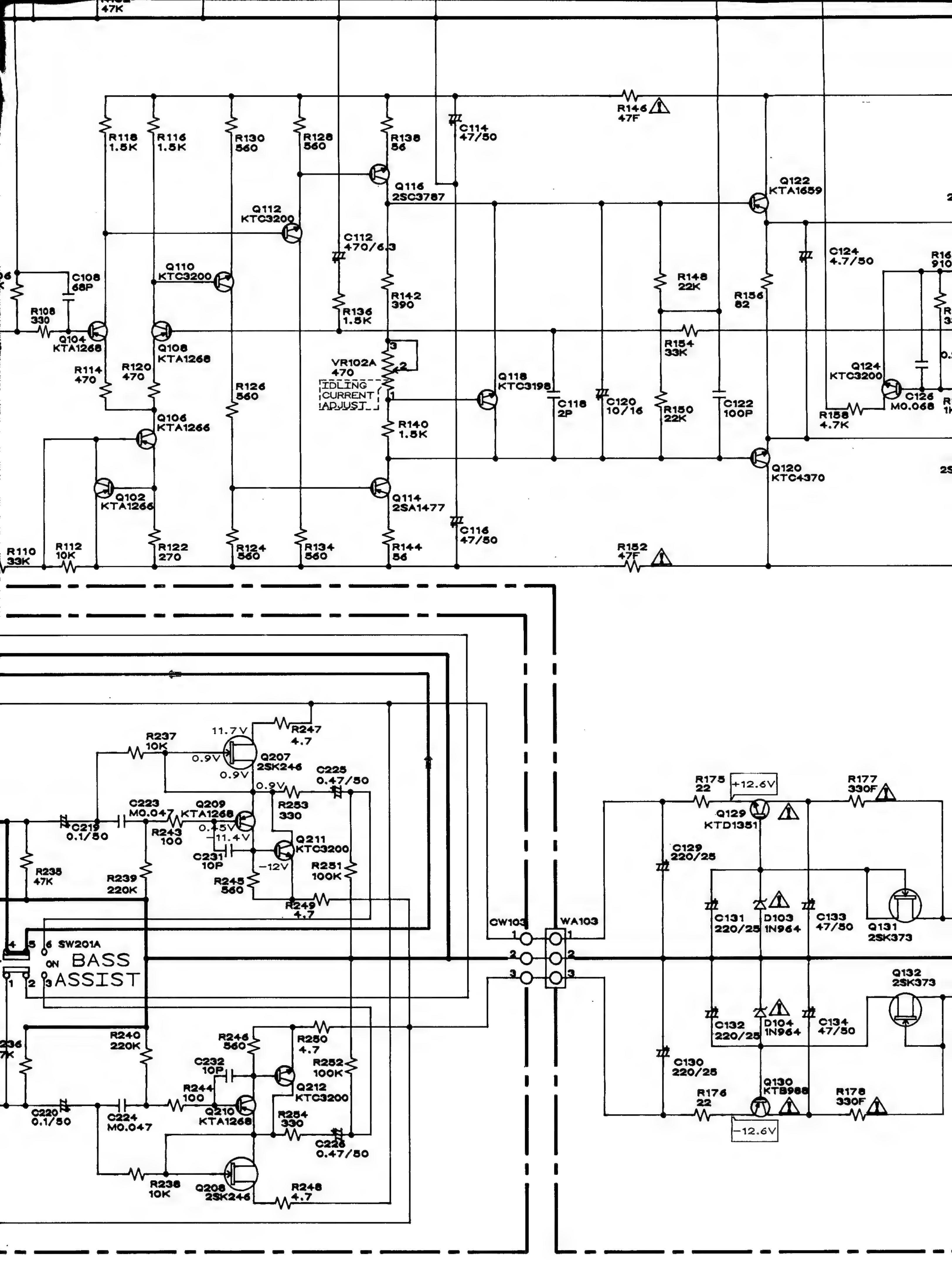
THE ⚠ MARK FOUND ON SOME COMPONANT PARTS INDICATES THE IMPORTANCE OF THE SAFETY FACTOR OF THE PART. THEREFORE, WHEN REPLACING, BE SURE TO USE PARTS OF IDENTICAL DESIGNATION.

※THIS IS THE BASIC SCHEMATIC DIAGRAM, BUT THE ACTUAL CIRCUIT MAY VARY DUE TO IMPROVEMENTS IN DESIGN.

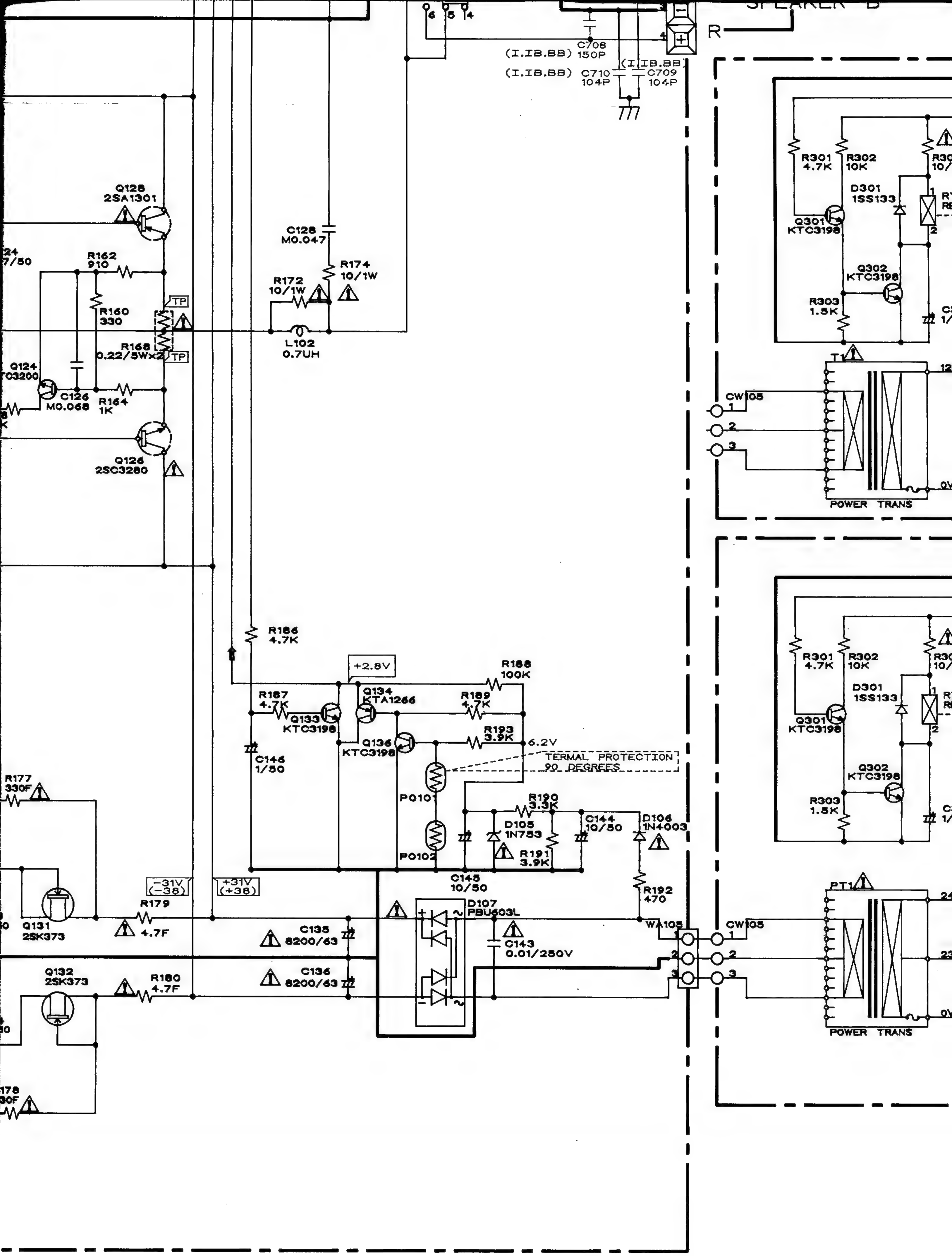
C701 - C722 : FOR FTZ (I.IB.BB)



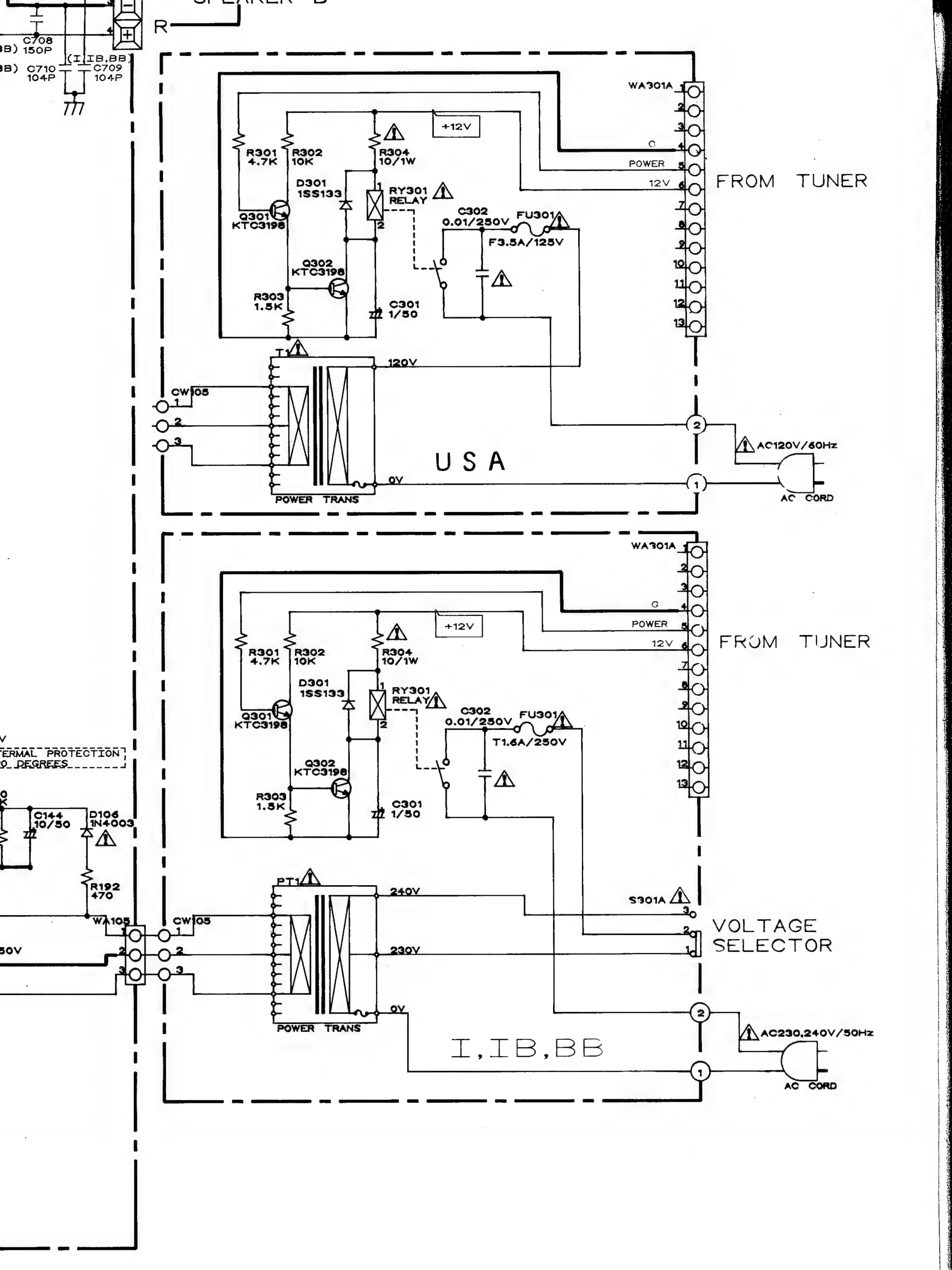

BALANCE
VR201
250KMN
SW201A
BASS
ASSIST
OFF
ON
CW102
WA102
VR202B
100K
VR203B
100K
Q201
KTC3198
Q202
KTC3198
Q203
KTA1266
Q204
KTA1266
Q205
KTA1266
Q206
KTA1266
Q104
KTA1268
D102
1SS133



R118 1.5K
R116 1.5K
R130 560
R128 560
R138 56
C114 47/50
R146 47F
Q116 2SC3787
Q122 KTA1659
Q112 KTC3200
C112 470/6.3
C124 4.7/50
Q110 KTC3200
C108 68P
R148 22K
R156 82
R142 390
R108 330
R136 1.5K
Q104 KTA1268
Q108 KTA1268
R154 33K
VR102A 470
IDLING CURRENT ADJUST
R114 470
R120 470
R126 560
Q118 KTC3198
Q124 KTC3200
C118 2P
C120 10/16
R150 22K
C122 100P
C126 M0.068
R158 4.7K
Q106 KTA1266
R140 1.5K
Q120 KTC4370
Q102 KTA1266
Q114 2SA1477
C116 47/50
R110 33K
R112 10K
R122 270
R124 560
R134 560
R144 56
R152 47F
R237 10K
11.7V
0.9V
Q207 2SK246
R247 4.7
C225 0.47/50
C223 M0.047
Q209 KTA1268
R253 330
R175 22
+12.6V
R177 330F
Q129 KTD1351
C219 0.1/50
R243 100
0.45V
-11.4V
Q211 KTC3200
C231 10P
-12V
R251 100K
C129 220/25
R235 47K
R239 220K
R245 560
R249 4.7
C131 220/25
D103 1N964
C133 47/50
Q131 2SK373
CW103
WA103
SW201A
ON
BASS ASSIST
Q132 2SK373
R240 220K
R246 560
R250 4.7
C132 220/25
D104 1N964
C134 47/50
C232 10P
R252 100K
C130 220/25
R244 100
Q212 KTC3200
Q130 KTB988
R176 22
R178 330F
C220 0.1/50
C224 M0.047
Q210 KTA1268
R254 330
-12.6V
C226 0.47/50
R238 10K
Q208 2SK246
R248 4.7



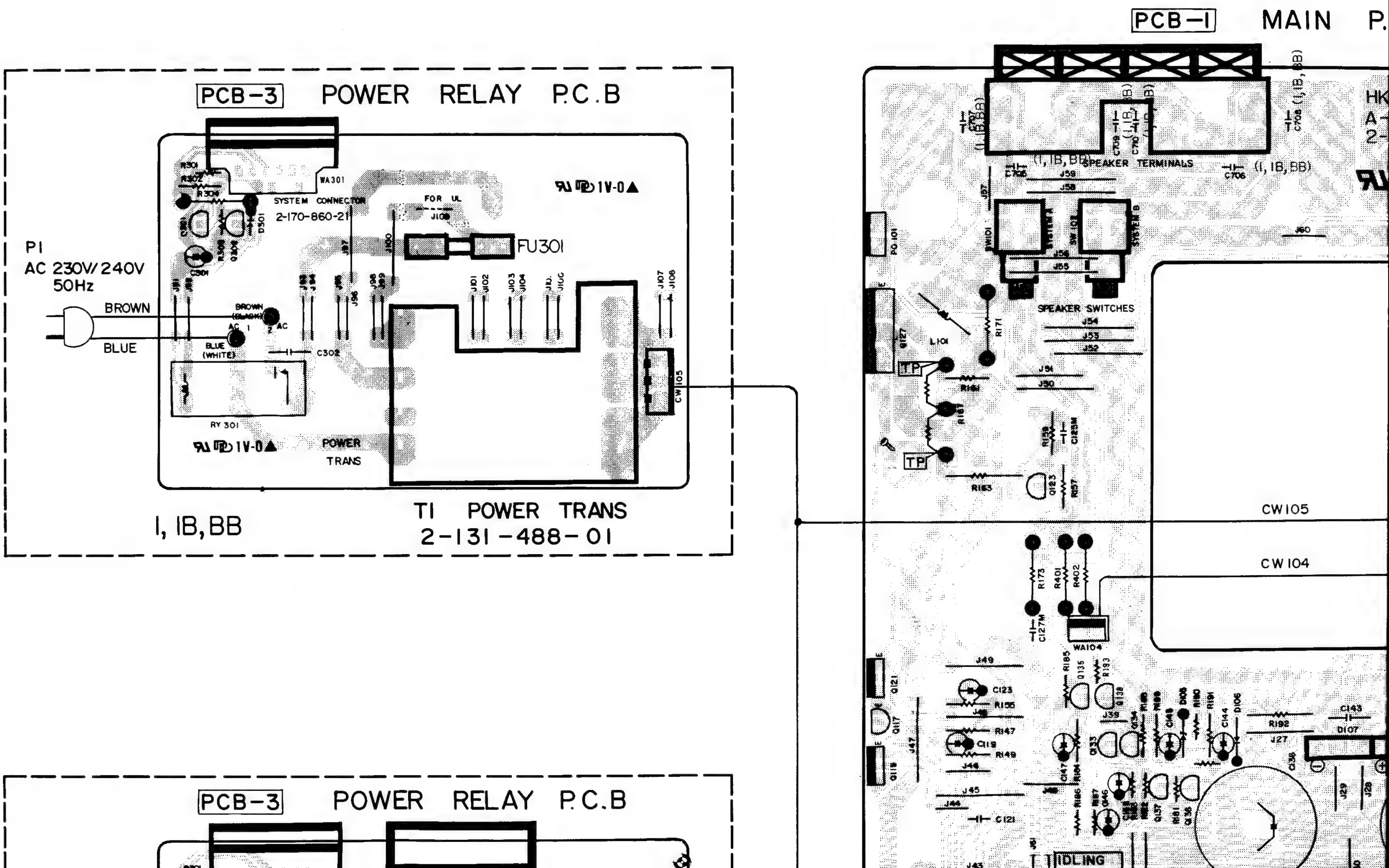
C708
(I.IB.BB) 150P
(I.IB.BB) C710 104P
(I.IB.BB) C709 104P
R
Q128 2SA1301
R162 910
R160 330
R168 0.22/5Wx2
TP
TP
Q124
C126 M0.068
R164 1K
Q126 2SC3280
C128 M0.047
R174 10/1W
R172 10/1W
L102 0.7UH
R301 4.7K
R302 10K
D301 1SS133
Q301 KTC3198
Q302 KTC3198
R303 1.5K
T1
CW105
POWER TRANS
0V
R186 4.7K
+2.8V
R188 100K
R187 4.7K
Q134 KTA1266
R189 4.7K
Q133 KTC3198
R193 3.9K
Q136 KTC3198
6.2V
TERMAL PROTECTION 90 DEGREES
C146 1/50
P0101
P0102
R190 3.3K
D105 1N753
C144 10/50
D106 1N4003
R191 3.9K
C145 10/50
R192 470
D107 PBU603L
R177 330F
−31V (−38)
+31V (+38)
R179 4.7F
Q131 2SK373
C135 8200/63
C143 0.01/250V
WA105
Q132 2SK373
R180 4.7F
C136 8200/63
R178
R301 4.7K
R302 10K
D301 1SS133
Q301 KTC3198
Q302 KTC3198
R303 1.5K
PT1
CW105
POWER TRANS
0V



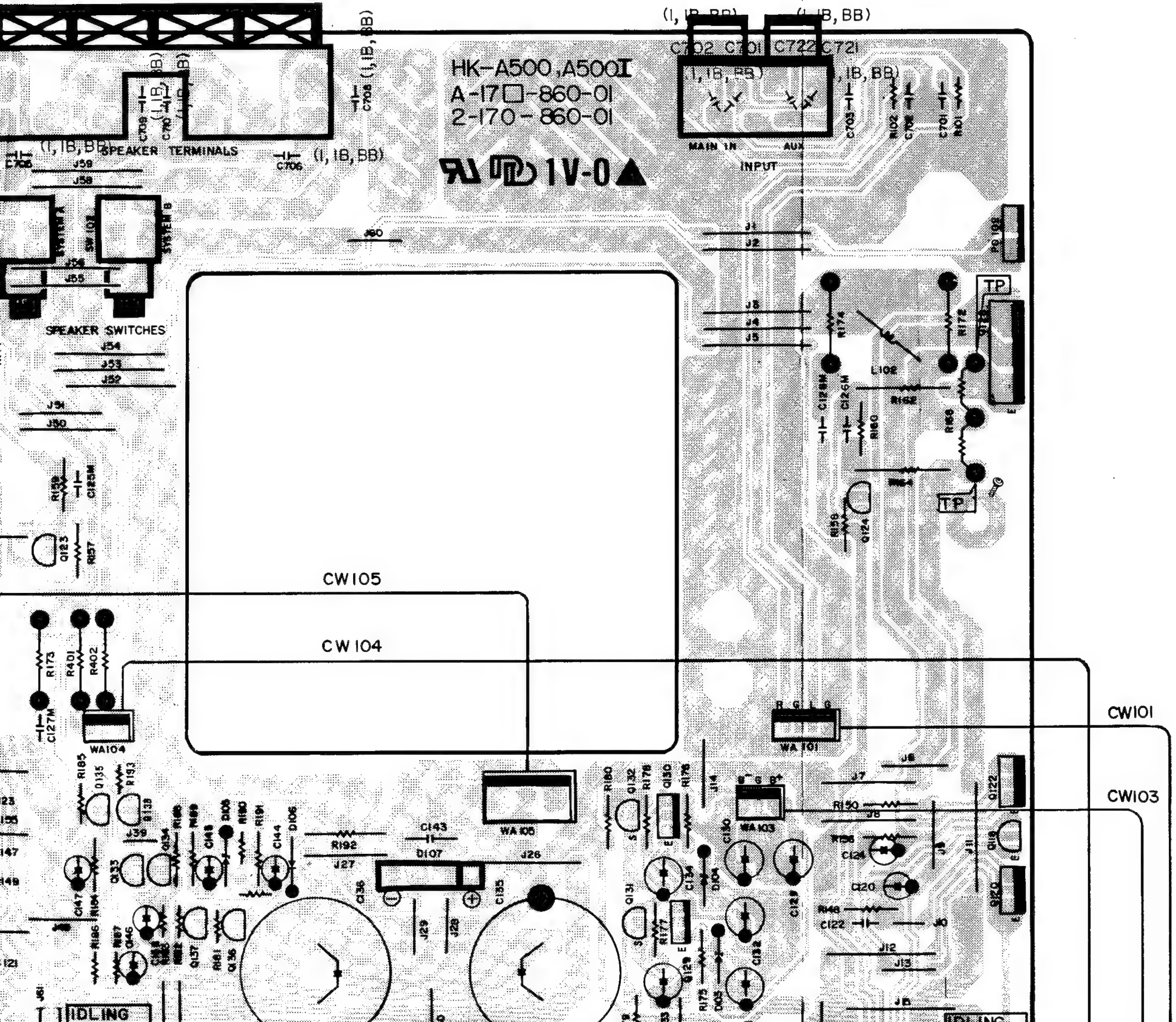
C708
150P
C710
104P
(I,IB,BB)
C709
104P
R
WA301A
+12V
R301
4.7K
R302
10K
R304
10/1W
D301
1SS133
RY301
RELAY
Q301
KTC3198
C302
0.01/250V
FU301
F3.5A/125V
Q302
KTC3198
R303
1.5K
C301
1/50
G
POWER
12V
FROM TUNER
T1
120V
CW105
0V
POWER TRANS
USA
AC120V/60Hz
AC CORD
WA301A
+12V
R301
4.7K
R302
10K
R304
10/1W
D301
1SS133
RY301
RELAY
Q301
KTC3198
C302
0.01/250V
FU301
T1.6A/250V
Q302
KTC3198
R303
1.5K
C301
1/50
G
POWER
12V
FROM TUNER
ERMAL PROTECTION
0 DEGREES
C144
10/50
D106
1N4003
R192
470
WA105
CW105
50V
PT1
240V
230V
0V
POWER TRANS
S301A
VOLTAGE SELECTOR
I,IB,BB
AC230,240V/50Hz
AC CORD

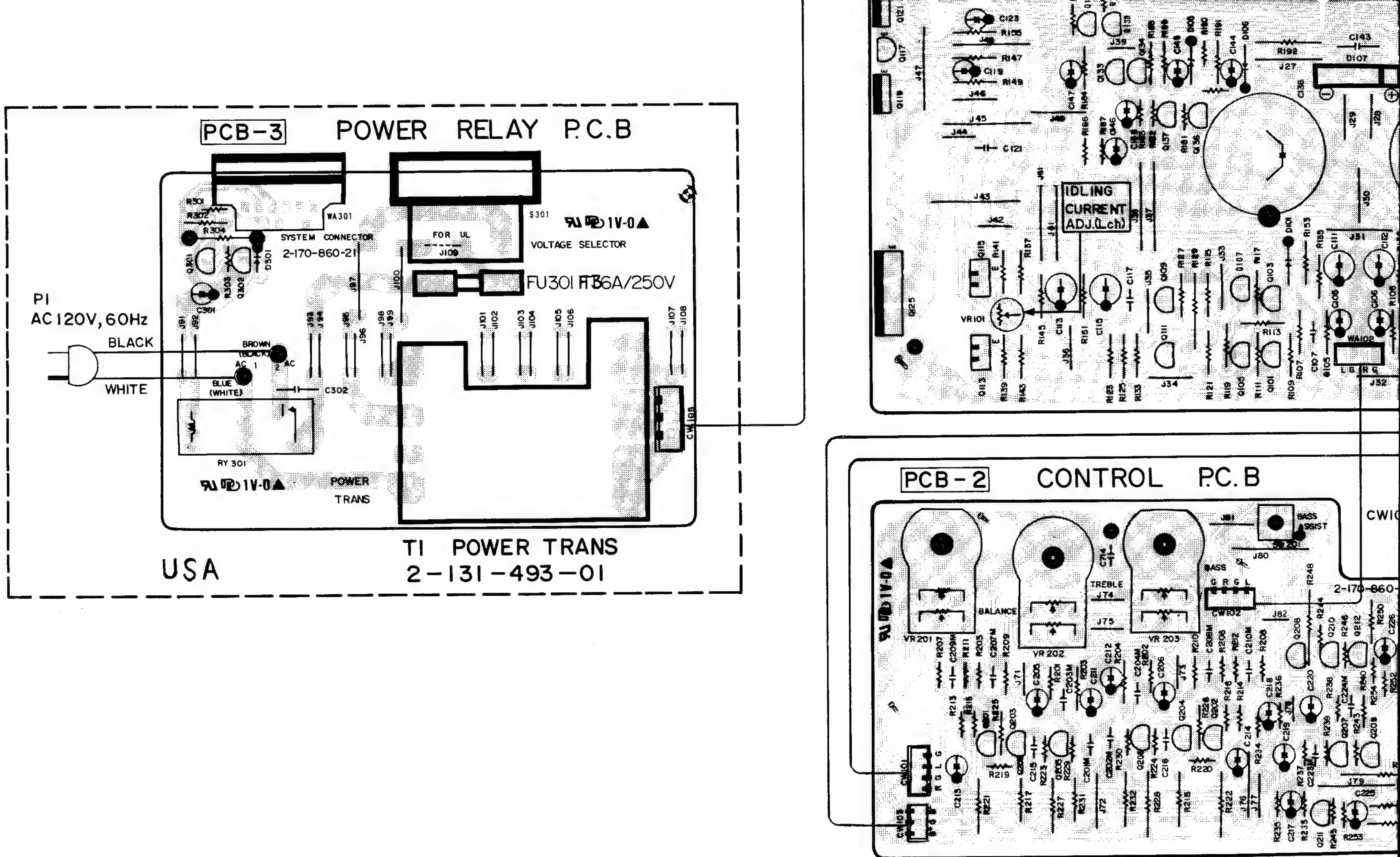
WIRING DIAGRAM

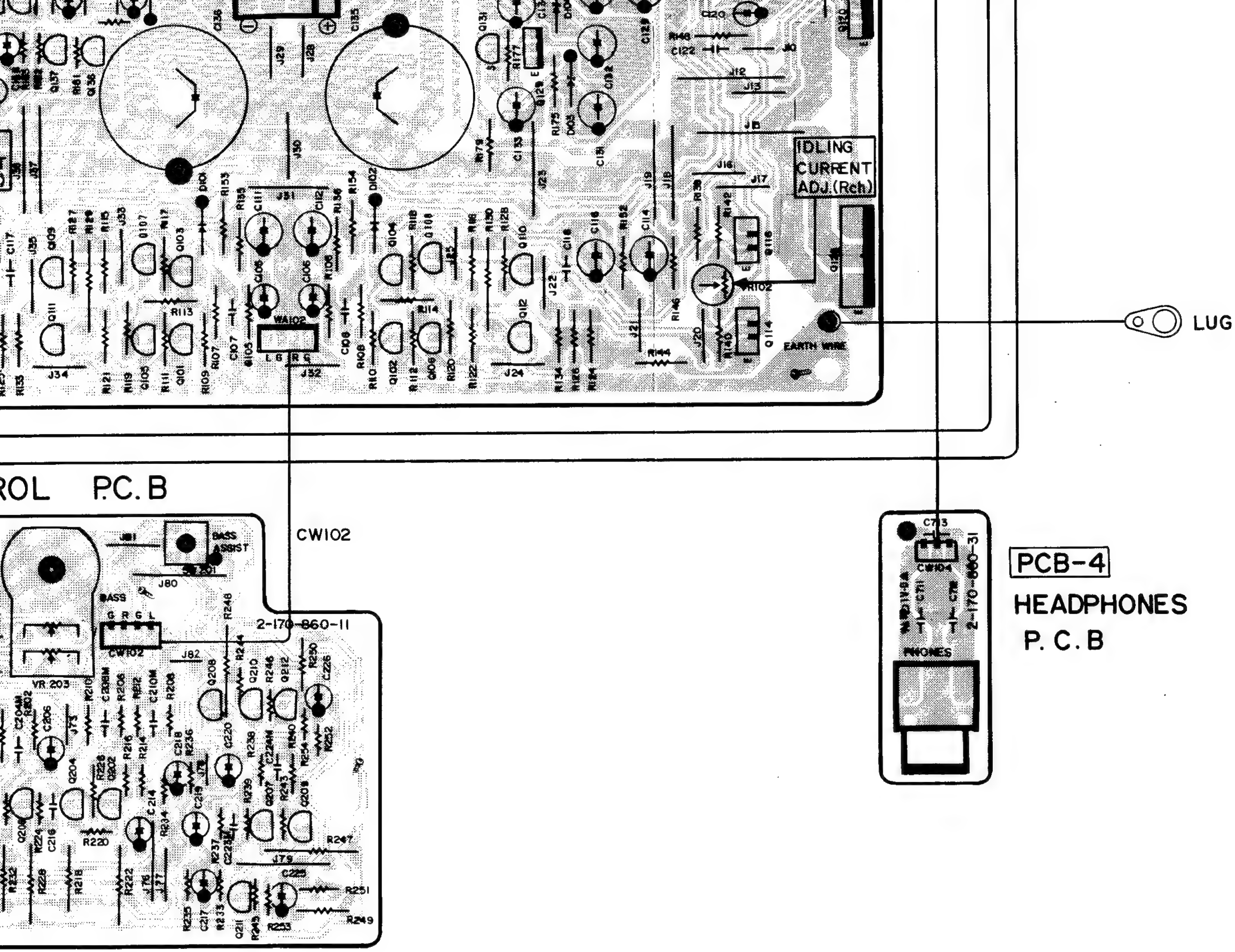
A-500



PCB–1 MAIN P.C.B

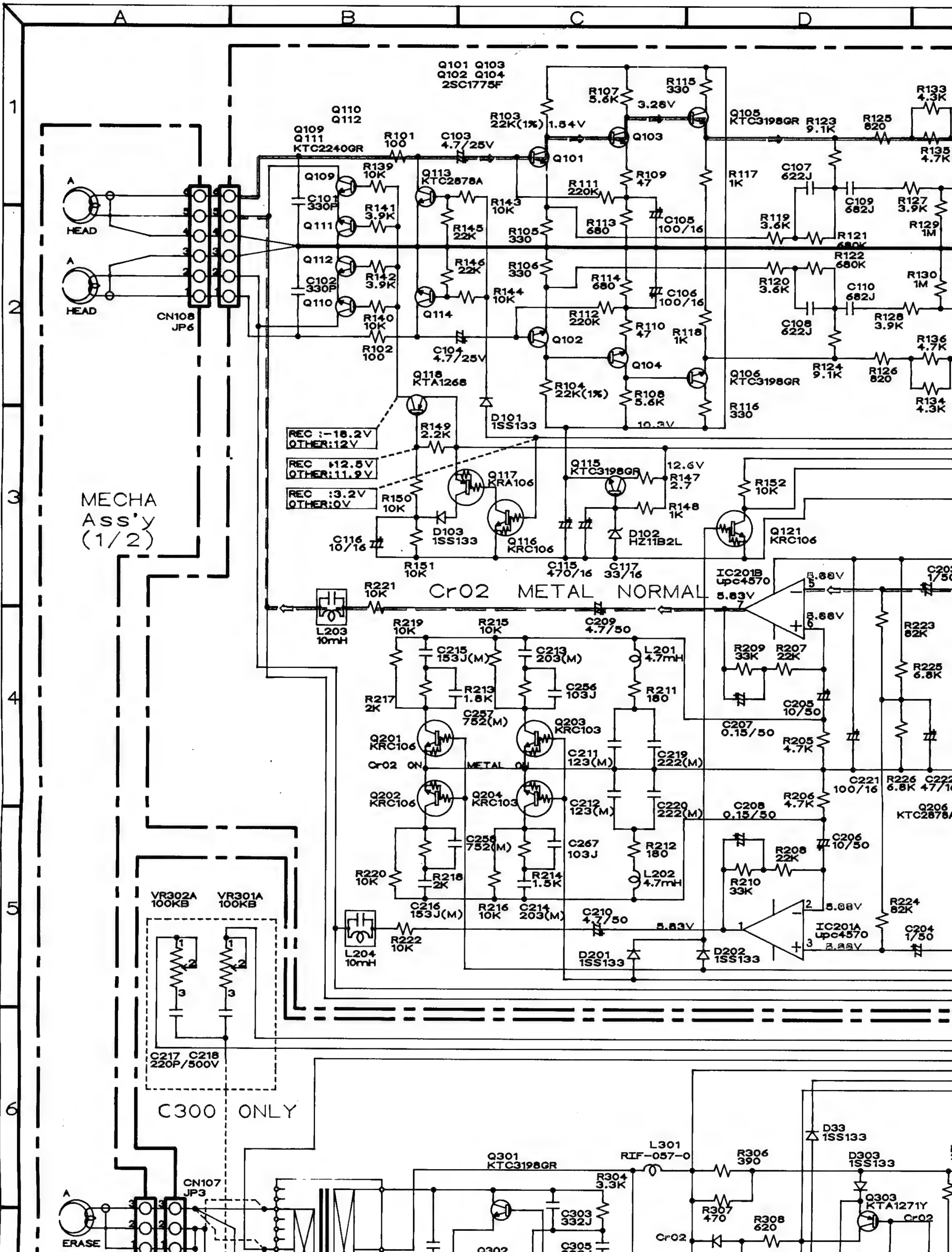


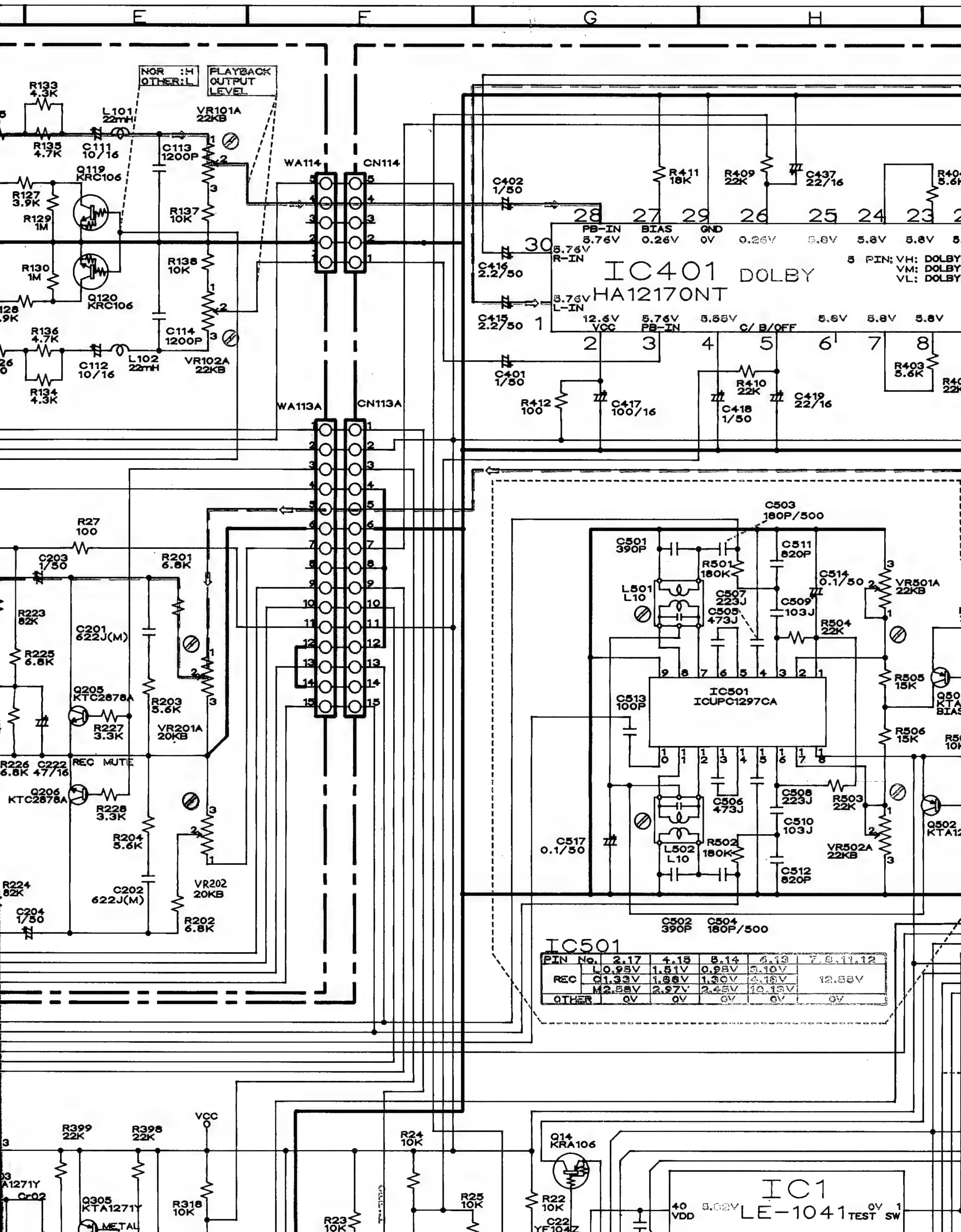

PCB-3
POWER RELAY P.C.B
WA301
SYSTEM CONNECTOR
2-170-860-21
S301
VOLTAGE SELECTOR
FOR UL
FU301 T3.15A/250V
P1
AC120V, 60Hz
BLACK
WHITE
BROWN (BLACK)
BLUE (WHITE)
RY 301
C302
CW105
POWER TRANS
USA
T1 POWER TRANS
2-131-493-01
IDLING CURRENT ADJ.(Lch)
VR101
PCB-2
CONTROL P.C.B
BASS ASSIST
BALANCE
TREBLE
BASS
VR201
VR202
VR203
CW101
CW102
CW103
2-170-860-



IDLING CURRENT ADJ.(Rch)
EARTH WIRE
LUG
ROL P.C.B
CW102
2-170-860-11
BASS ASSIST
VR 203
PCB-4
HEADPHONES
P. C. B
2-170-860-31
PHONES
CW104

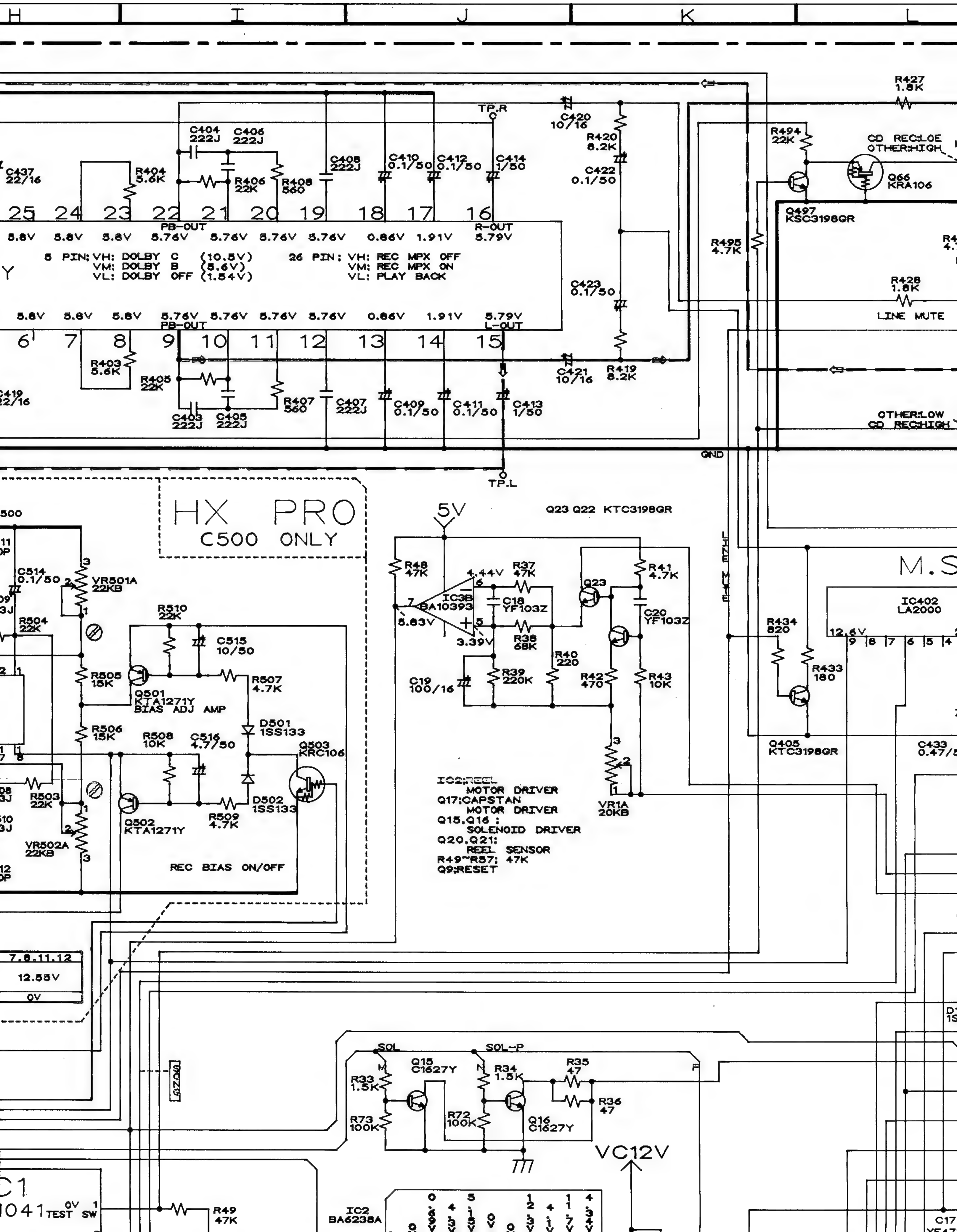
SCHEMATIC DIAGRAM (C300/C500)



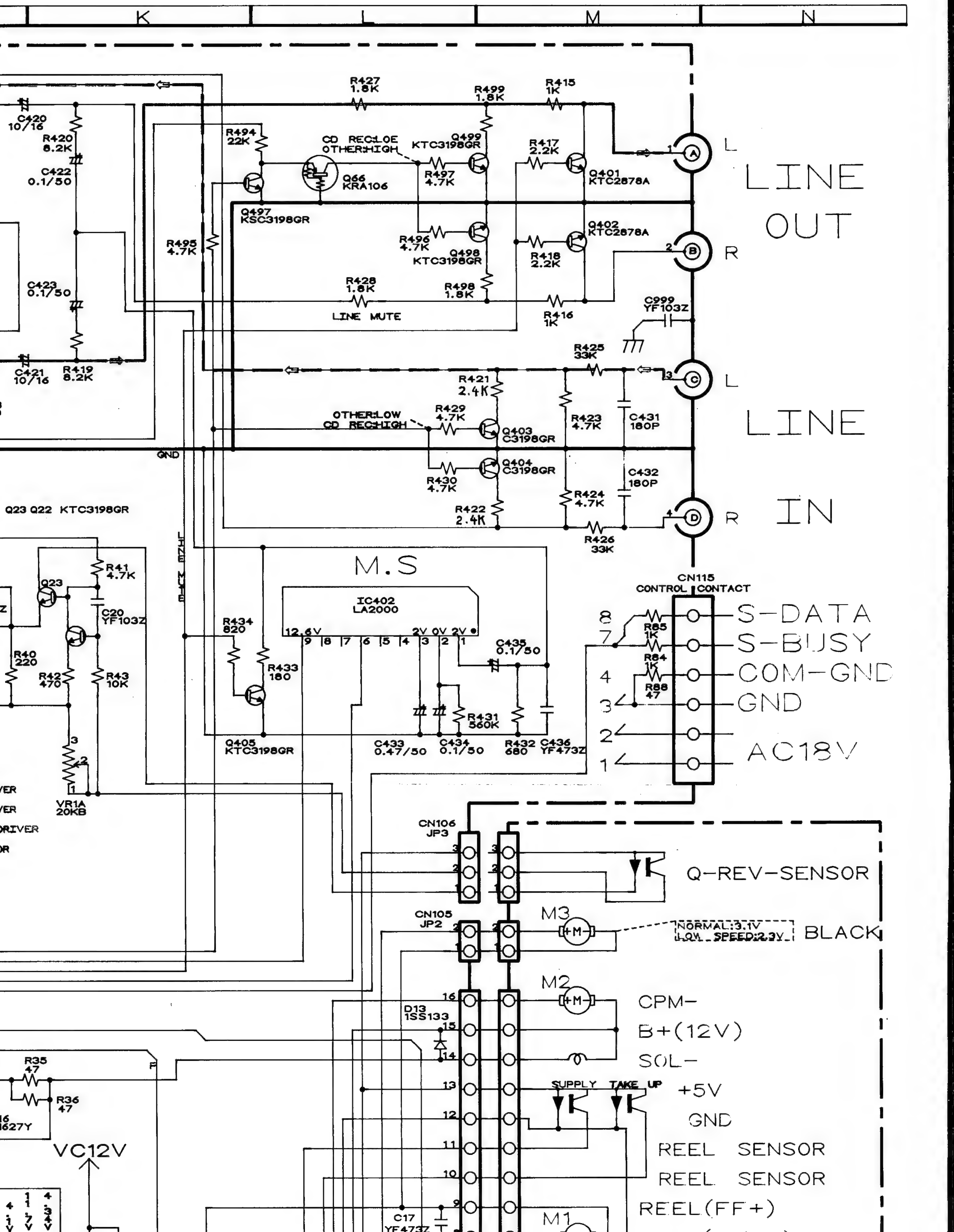


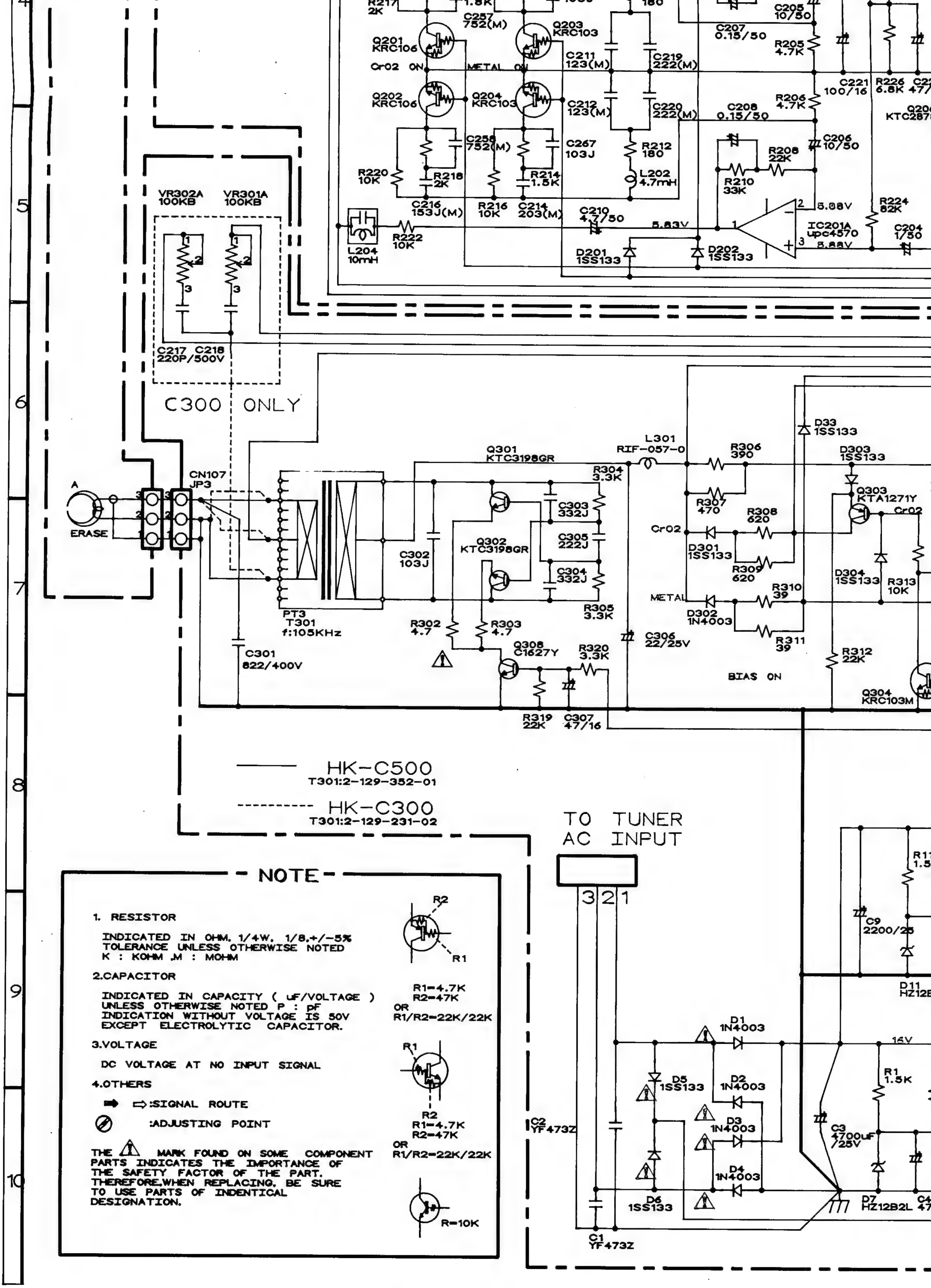
IC501

PIN No.		2,17	4,15	5,14	3,13	7,8,11,12
REC	L	0,95V	1,51V	0,98V	3,10V	12,88V
	C	1,33V	1,88V	1,30V	4,18V	
	M	2,58V	2,97V	2,45V	10,13V	
OTHER		0V	0V	0V	0V	0V



H
I
J
K
L
R427 1.8K
TP.R
C420 10/16
C404 222J
C406 222J
R420 8.2K
R494 22K
CD REC:LOE
OTHER:HIGH
C437 22/16
R404 5.6K
R406 22K
R408 560
C408 222J
C410 0.1/50
C412 0.1/50
C414 1/50
C422 0.1/50
Q66 KRA106
Q497 KSC3198GR
25 24 23 22 21 20 19 18 17 16
PB-OUT
R-OUT
5.8V 5.8V 5.8V 5.76V 5.76V 5.76V 5.76V 0.86V 1.91V 5.79V
5 PIN: VH: DOLBY C (10.5V)
VM: DOLBY B (5.6V)
VL: DOLBY OFF (1.54V)
26 PIN: VH: REC MPX OFF
VM: REC MPX ON
VL: PLAY BACK
R495 4.7K
C423 0.1/50
R428 1.8K
LINE MUTE
5.8V 5.8V 5.8V 5.76V 5.76V 5.76V 5.76V 0.86V 1.91V 5.79V
PB-OUT
L-OUT
6 7 8 9 10 11 12 13 14 15
R403 5.6K
R405 22K
C421 10/16
R419 8.2K
C419 22/16
R407 560
C407 222J
C409 0.1/50
C411 0.1/50
C413 1/50
C403 222J
C405 222J
OTHER:LOW
CD REC:HIGH
GND
TP.L
HX PRO
C500 ONLY
5V
Q23 Q22 KTC3198GR
LINE MUTE
M.S
C514 0.1/50
VR501A 22KB
R504 22K
R510 22K
C515 10/50
R48 47K
4.44V
R37 47K
IC3B BA10393
C18 YF103Z
Q23
R41 4.7K
C20 YF103Z
IC402 LA2000
5.83V
3.39V
R38 68K
R40 220
R434 820
12.6V
R433 180
R505 15K
Q501 KTA1271Y
BIAS ADJ AMP
R507 4.7K
C19 100/16
R39 220K
R42 470
R43 10K
R506 15K
R508 10K
C516 4.7/50
D501 1SS133
Q503 KRC106
Q405 KTC3198GR
C433 0.47/5
R503 22K
Q502 KTA1271Y
R509 4.7K
D502 1SS133
VR1A 20KB
IC2:REEL MOTOR DRIVER
Q17:CAPSTAN MOTOR DRIVER
Q15,Q16 : SOLENOID DRIVER
Q20,Q21: REEL SENSOR
R49~R57: 47K
Q9:RESET
VR502A 22KB
REC BIAS ON/OFF
7,8,11,12
12.55V
0V
SOL
SOL-P
Q15 C1627Y
R33 1.5K
R34 1.5K
R35 47
R36 47
R73 100K
R72 100K
Q16 C1627Y
VC12V
IC1
TEST
SW
R49 47K
IC2 BA6238A


K
L
M
N
R427 1.8K
R499 1.8K
R415 1K
C420 10/16
R420 8.2K
C422 0.1/50
R494 22K
CD REC:LOE
OTHER:HIGH
Q499 KTC3198GR
R417 2.2K
Q66 KRA106
R497 4.7K
Q401 KTC2878A
LINE
OUT
Q497 KSC3198GR
Q402 KTC2878A
R495 4.7K
R496 4.7K
Q498 KTC3198GR
R418 2.2K
C423 0.1/50
R428 1.8K
R498 1.8K
LINE MUTE
R416 1K
C999 YF103Z
R425 33K
C421 10/16
R419 8.2K
R421 2.4K
OTHER:LOW
CD REC:HIGH
R429 4.7K
Q403 C3198GR
R423 4.7K
C431 180P
LINE
GND
Q404 C3198GR
R430 4.7K
C432 180P
R424 4.7K
Q23 Q22 KTC3198GR
R422 2.4K
R426 33K
IN
L
R
L
R
M.S
CN115
CONTROL CONTACT
R41 4.7K
Q23
IC402 LA2000
C20 YF103Z
R434 820
12.6V
2V 0V 2V
C435 0.1/50
S-DATA
R85 1K
S-BUSY
R84 1K
COM-GND
R88 47
GND
R40 220
R42 470
R43 10K
R433 180
R431 560K
AC18V
Q405 KTC3198GR
C433 0.47/50
C434 0.1/50
R432 680
C436 YF473Z
VR1A 20KB
CN106 JP3
Q-REV-SENSOR
CN105 JP2
M3
NORMAL:3.1V
LOW SPEED:2.3V
BLACK
M2
CPM-
D13 1SS133
B+(12V)
SOL-
R35 47
SUPPLY
TAKE UP
+5V
R36 47
GND
VC12V
REEL SENSOR
REEL SENSOR
REEL(FF+)
C17 YF473Z
M1



NOTE

1. RESISTOR

INDICATED IN OHM, 1/4W, 1/8,+/-5% TOLERANCE UNLESS OTHERWISE NOTED
K : KOHM ,M : MOHM

2. CAPACITOR

INDICATED IN CAPACITY (uF/VOLTAGE) UNLESS OTHERWISE NOTED P : pF INDICATION WITHOUT VOLTAGE IS 50V EXCEPT ELECTROLYTIC CAPACITOR.

3. VOLTAGE

DC VOLTAGE AT NO INPUT SIGNAL

4. OTHERS

⇒ :SIGNAL ROUTE

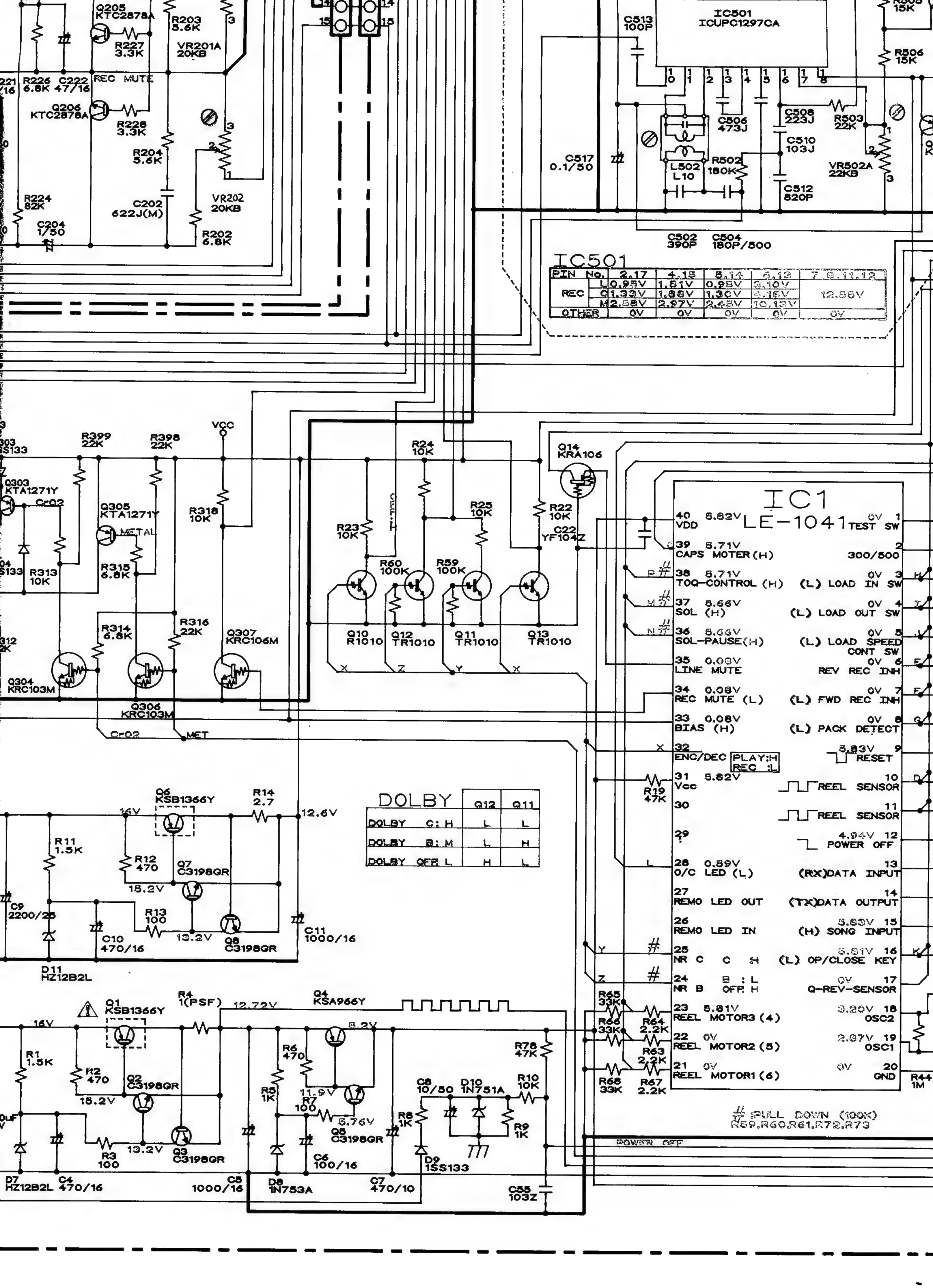
:ADJUSTING POINT

THE ⚠ MARK FOUND ON SOME COMPONENT PARTS INDICATES THE IMPORTANCE OF THE SAFETY FACTOR OF THE PART. THEREFORE,WHEN REPLACING, BE SURE TO USE PARTS OF INDENTICAL DESIGNATION.

R1=4.7K R2=47K OR R1/R2=22K/22K

R1=4.7K R2=47K OR R1/R2=22K/22K

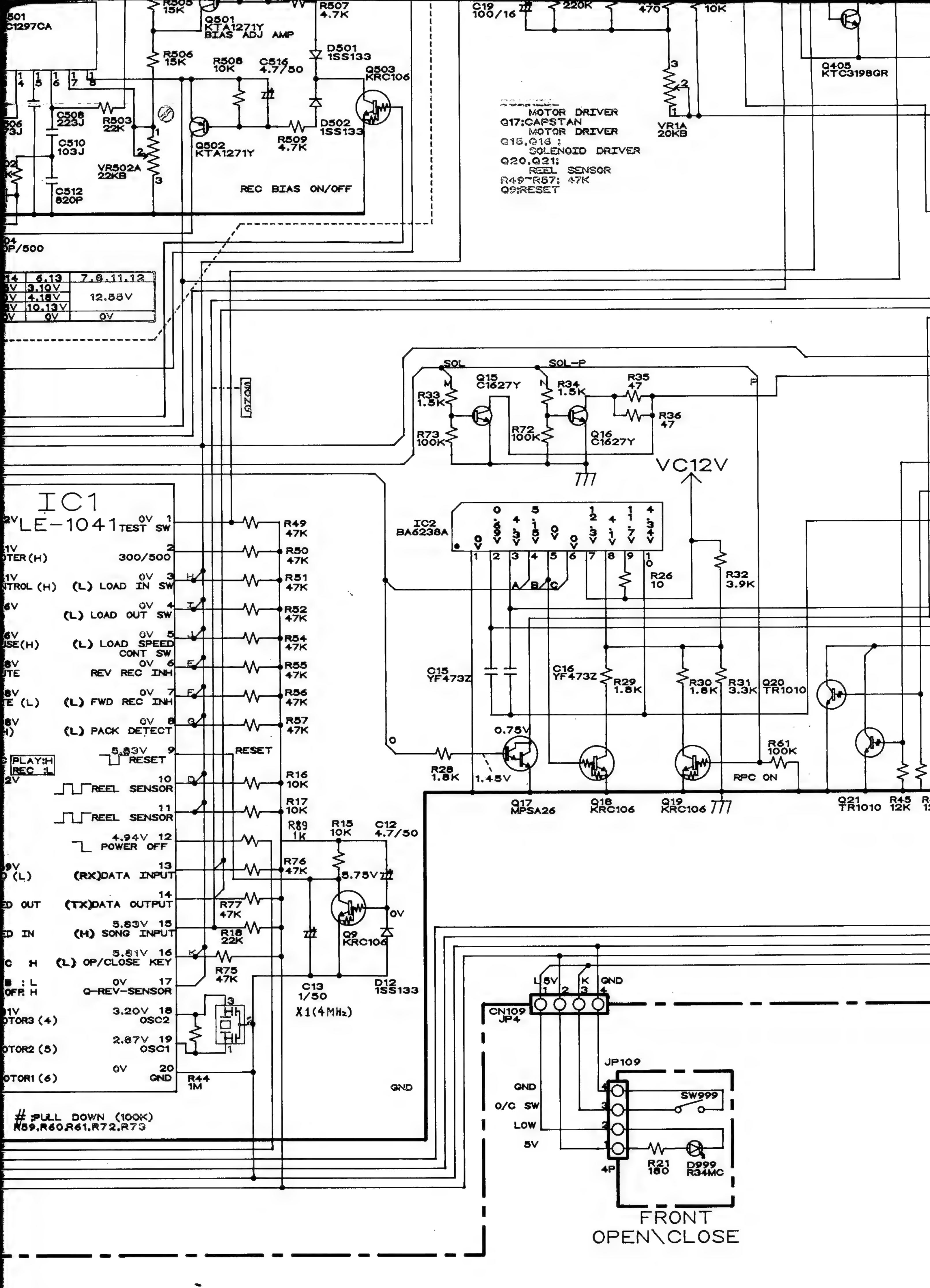
R=10K



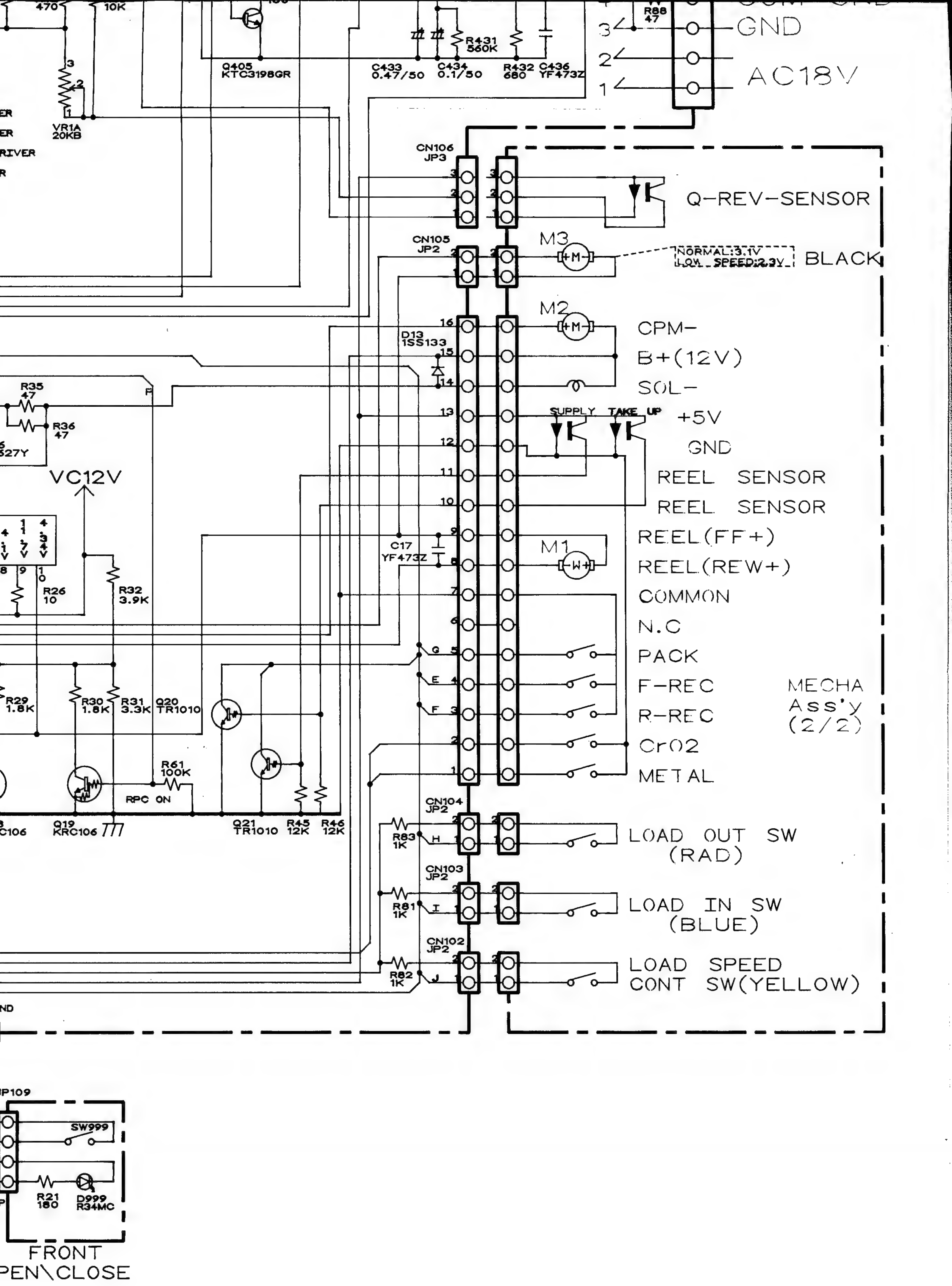
IC501

PIN No.		2,17	4,15	5,14	6,13	7,8,11,12
REC	L	0.95V	1.81V	0.98V	3.10V	12.58V
	C	1.33V	1.86V	1.30V	4.18V	
	M	2.58V	2.97V	2.45V	10.13V	
OTHER		0V	0V	0V	0V	0V

DOLBY		Q12	Q11
DOLBY	C: H	L	L
DOLBY	B: M	L	H
DOLBY	OFF: L	H	L



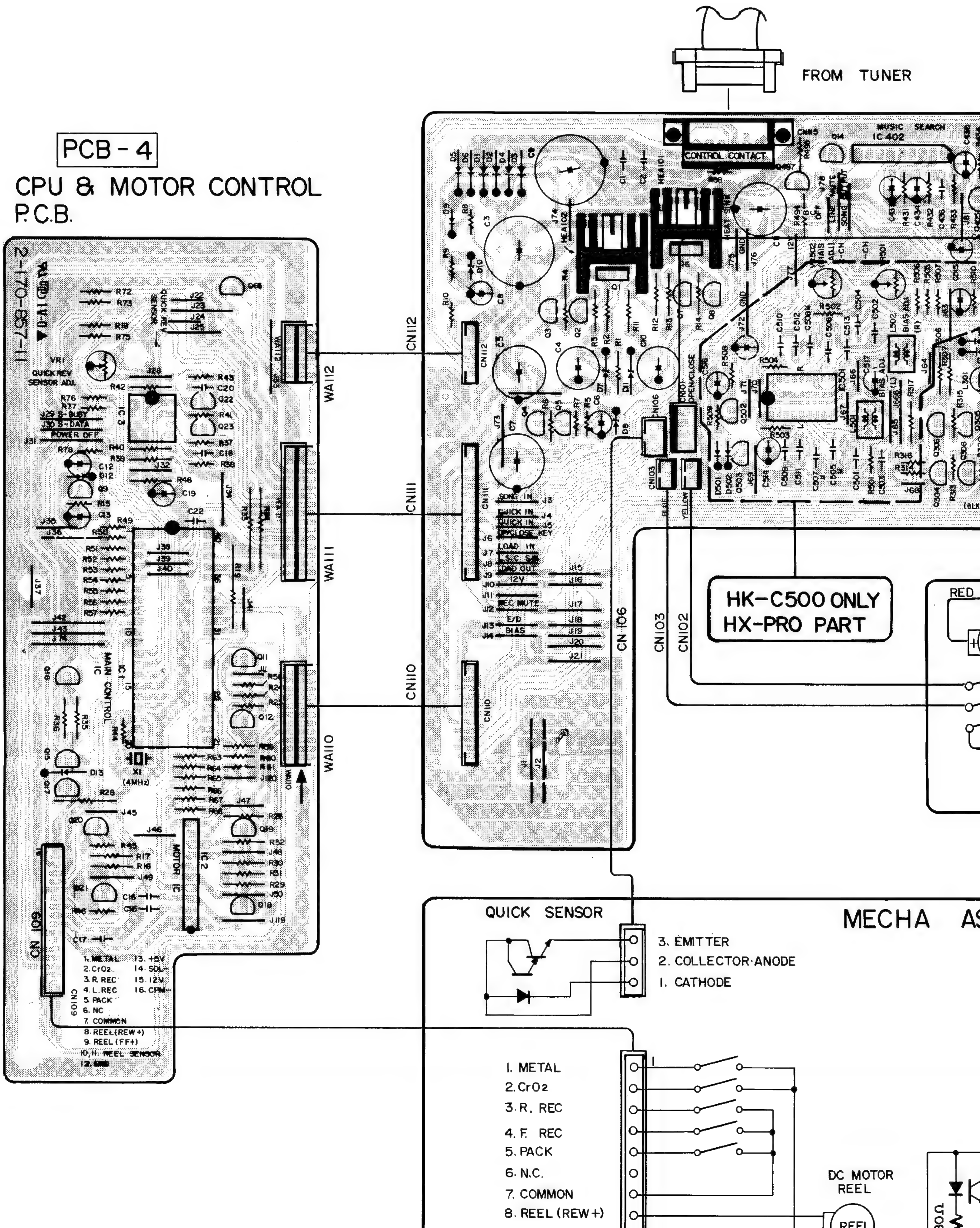
R505 15K
Q501 KTA1271Y BIAS ADJ AMP
R507 4.7K
C1297CA
R506 15K
R508 10K
C516 4.7/50
D501 1SS133
Q503 KRC106
C508 223J
R503 22K
C510 103J
VR502A 22KB
C512 820P
Q502 KTA1271Y
R509 4.7K
D502 1SS133
REC BIAS ON/OFF
P/500
6.13
7.8.11.12
3.10V
4.18V
12.58V
10.13V
0V
0V
C19 100/16
220K
470
10K
Q405 KTC3198GR
MOTOR DRIVER
Q17:CAPSTAN MOTOR DRIVER
Q15,Q16 : SOLENOID DRIVER
Q20,Q21: REEL SENSOR
R49~R57: 47K
Q9:RESET
VR1A 20KB
SOL
SOL-P
Q15 C1627Y
R33 1.5K
R73 100K
R72 100K
R34 1.5K
Q16 C1627Y
R35 47
R36 47
VC12V
IC1
LE-1041
TEST SW
300/500
(L) LOAD IN SW
(L) LOAD OUT SW
(L) LOAD SPEED CONT SW
REV REC INH
(L) FWD REC INH
(L) PACK DETECT
RESET
REEL SENSOR
REEL SENSOR
POWER OFF
(RX)DATA INPUT
(TX)DATA OUTPUT
(H) SONG INPUT
(L) OP/CLOSE KEY
Q-REV-SENSOR
OSC2
OSC1
GND
PLAY:H
REC :L
R49 47K
R50 47K
R51 47K
R52 47K
R54 47K
R55 47K
R56 47K
R57 47K
R16 10K
R17 10K
R89 1K
R15 10K
C12 4.7/50
R76 47K
R77 47K
R18 22K
R75 47K
5.75V
Q9 KRC106
C13 1/50
D12 1SS133
X1(4MHz)
R44 1M
GND
PULL DOWN (100K)
R59,R60,R61,R72,R73
IC2 BA6238A
R26 10
R32 3.9K
C15 YF473Z
C16 YF473Z
R29 1.8K
R30 1.8K
R31 3.3K
Q20 TR1010
R61 100K
RPC ON
R28 1.8K
0.75V
1.45V
Q17 MPSA26
Q18 KRC106
Q19 KRC106
Q21 TR1010
R45 12K
CN109 JP4
5V
GND
JP109
GND
O/C SW
LOW
5V
SW999
4P
R21 180
D999 R34MC
FRONT OPEN\CLOSE

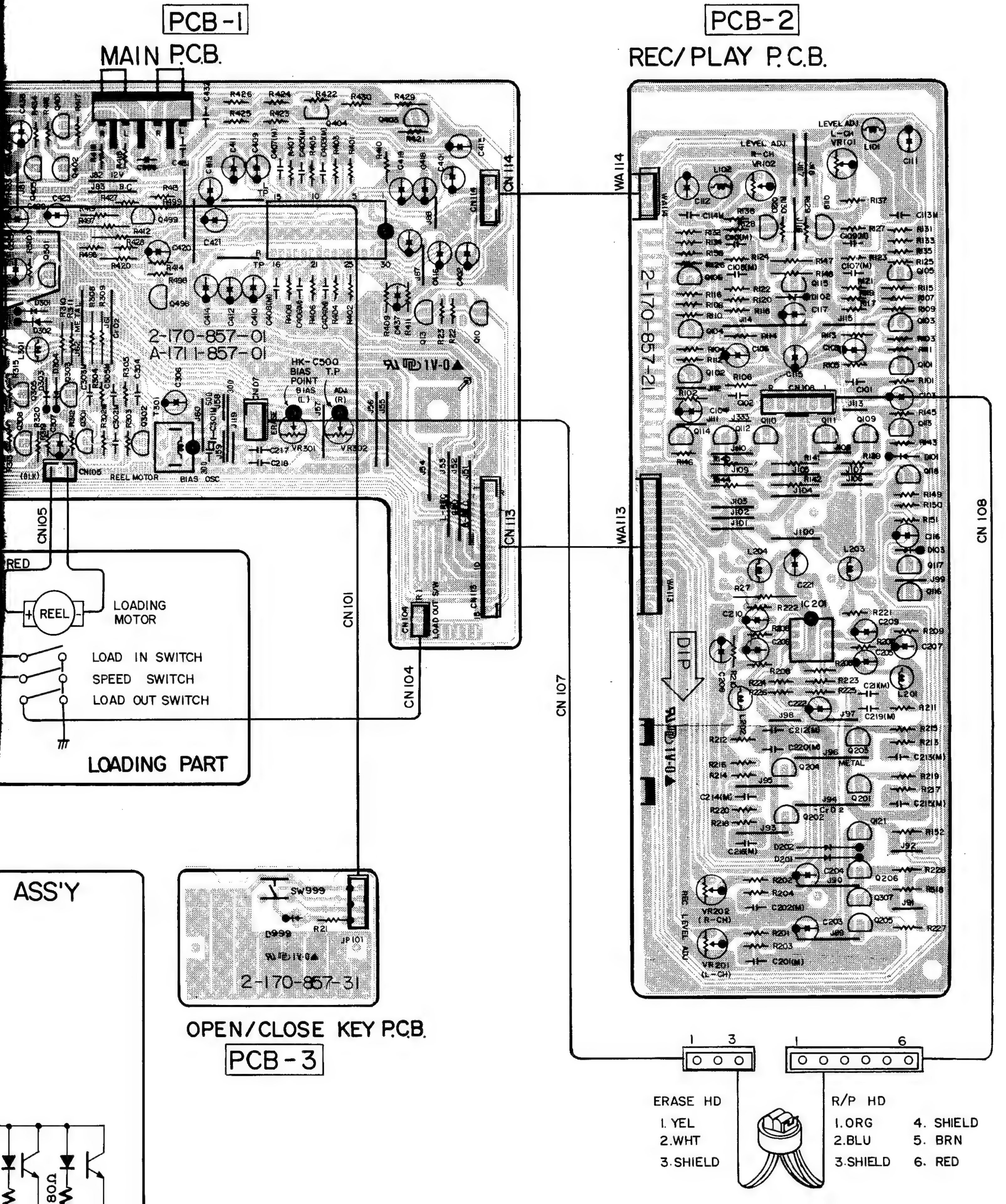


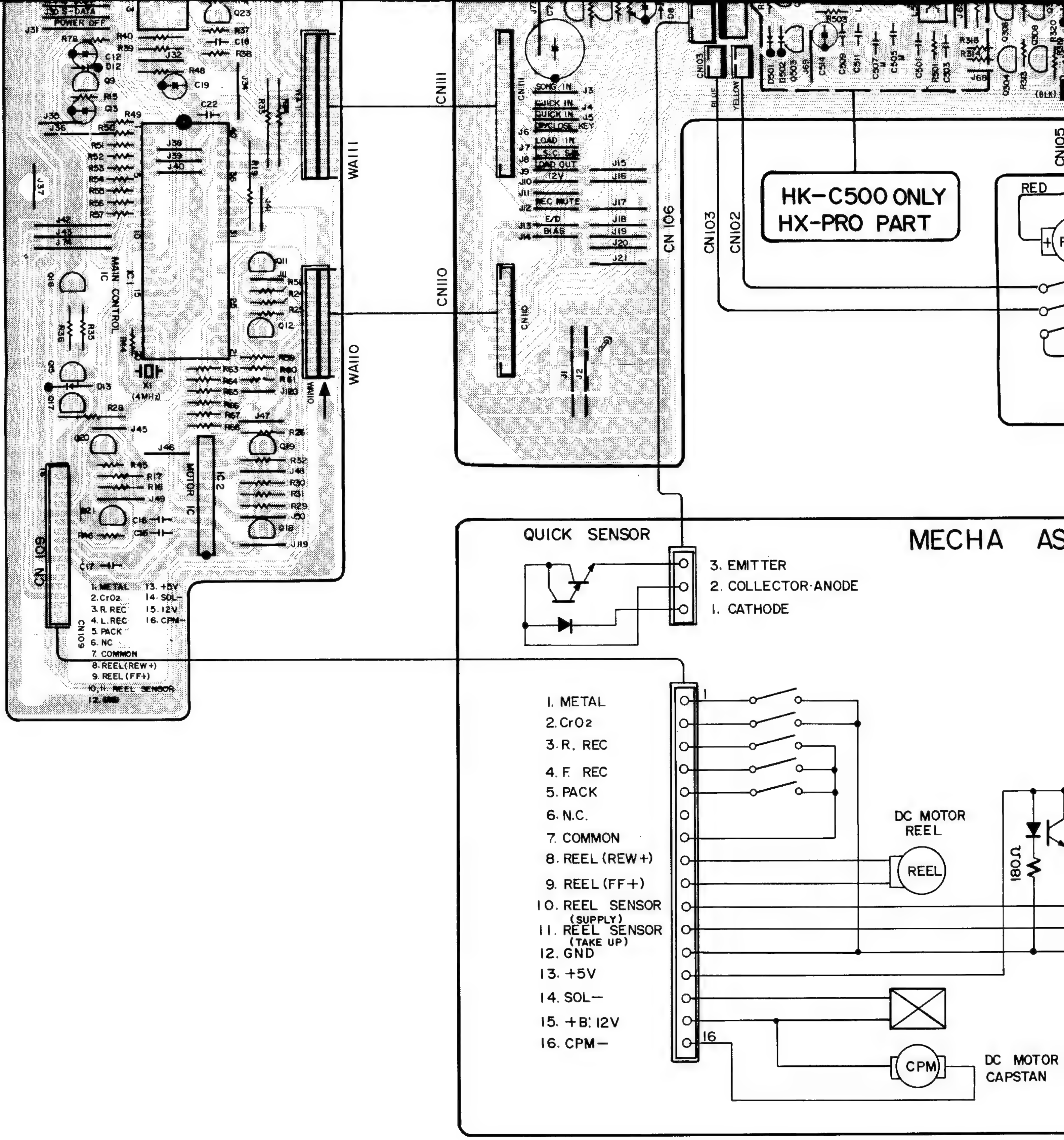
GND
AC18V
R88 47
CN106 JP3
Q-REV-SENSOR
CN105 JP2
M3
NORMAL:3.1V LOW SPEED:2.3V
BLACK
M2
CPM-
B+(12V)
SOL-
D13 1SS133
SUPPLY
TAKE UP
+5V
GND
REEL SENSOR
REEL SENSOR
REEL(FF+)
REEL(REW+)
C17 YF473Z
M1
COMMON
N.C
PACK
F-REC
R-REC
CrO2
METAL
MECHA Ass'y (2/2)
CN104 JP2
R83 1K
LOAD OUT SW (RAD)
CN103 JP2
R81 1K
LOAD IN SW (BLUE)
CN102 JP2
R82 1K
LOAD SPEED CONT SW(YELLOW)
Q405 KTC3198GR
C433 0.47/50
C434 0.1/50
R431 560K
R432 680
C436 YF473Z
VR1A 20KB
R35 47
R36 47
VC12V
R26 10
R32 3.9K
R29 1.8K
R30 1.8K
R31 3.3K
Q20 TR1010
R61 100K
RPC ON
Q19 KRC106
Q21 TR1010
R45 12K
R46 12K
SW999
R21 180
D999 R34MC
FRONT OPEN\CLOSE

WIRING DIAGRAM

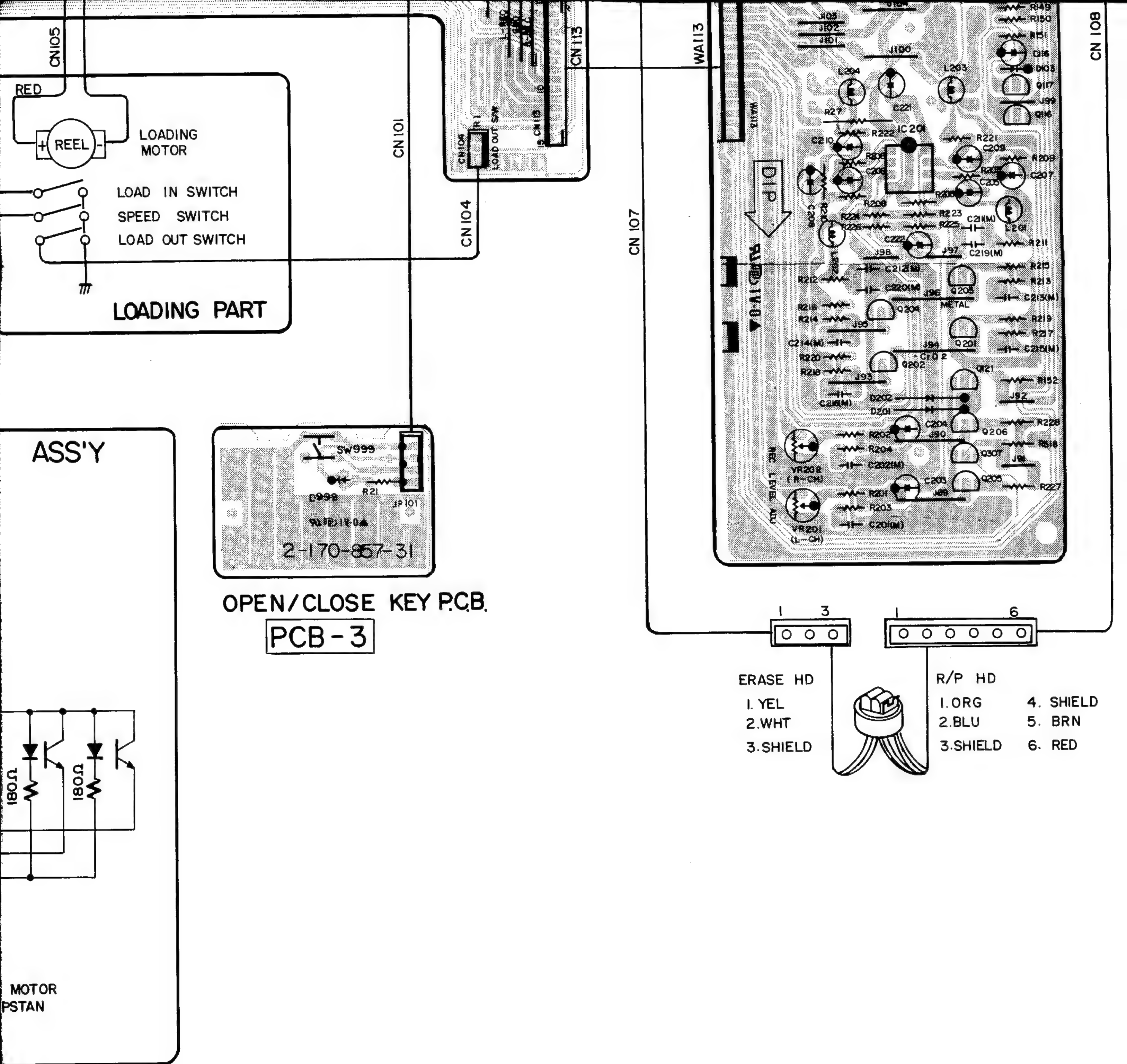
C300/500



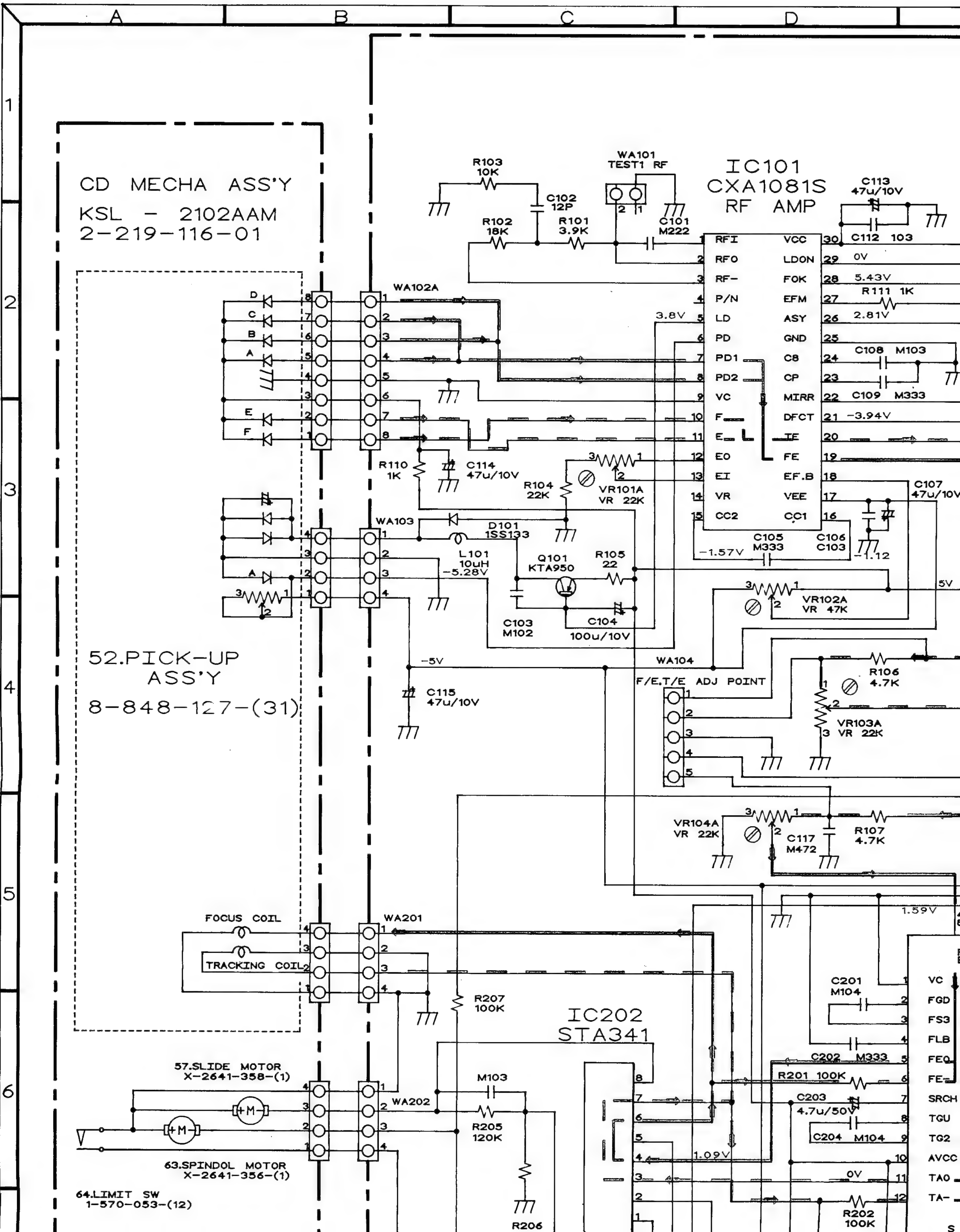

PCB-1
MAIN P.C.B.
2-170-857-01
A-1711-857-01
HK-C500
BIAS T.P.
BIAS POINT
BIAS ADJ (L) (R)
VR301
VR302
REEL MOTOR
BIAS OSC
CN105
CN101
CN104
CN107
CN113
CN114
CN108
PCB-2
REC/PLAY P.C.B.
2-170-857-21
LEVEL ADJ. L-CH VR101
LEVEL ADJ. R-CH VR102
WA114
WA113
IC201
DIP
REC LEVEL ADJ
VR202 (R-CH)
VR201 (L-CH)
RED
REEL
LOADING MOTOR
LOAD IN SWITCH
SPEED SWITCH
LOAD OUT SWITCH
LOADING PART
ASS'Y
SW999
D999
R21
JP101
2-170-857-31
OPEN/CLOSE KEY P.C.B.
PCB-3
ERASE HD
1. YEL
2.WHT
3.SHIELD
R/P HD
1.ORG
2.BLU
3.SHIELD
4. SHIELD
5. BRN
6. RED

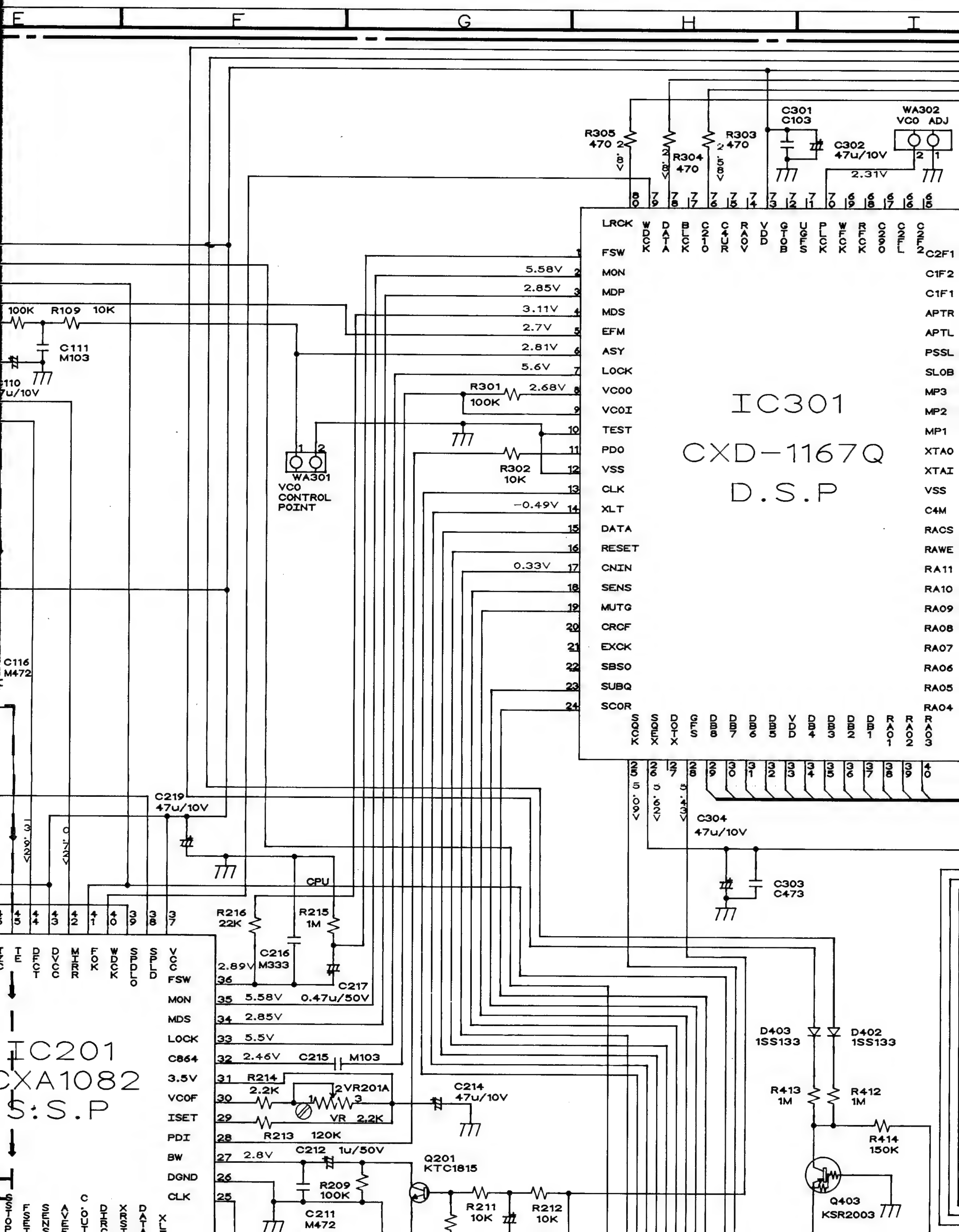


HK-C500 ONLY
HX-PRO PART
MAIN CONTROL IC
IC1
MOTOR IC
IC2
X1 (4MHz)
CN111
CN110
CN106
CN103
CN102
CN105
WA111
WA110
BLUE
YELLOW
RED
SONG IN
QUICK IN
OP/CLOSE KEY
LOAD IN
LOAD OUT
12V
REC MUTE
E/D
BIAS
POWER OFF
CN109
1. METAL
2. CrO2
3. R. REC
4. L. REC
5. PACK
6. NC
7. COMMON
8. REEL (REW+)
9. REEL (FF+)
10, 11. REEL SENSOR
13. +5V
14. SOL–
15. 12V
16. CPM–
MECHA AS
QUICK SENSOR
3. EMITTER
2. COLLECTOR·ANODE
1. CATHODE
1. METAL
2. CrO2
3. R. REC
4. F. REC
5. PACK
6. N.C.
7. COMMON
8. REEL (REW+)
9. REEL (FF+)
10. REEL SENSOR (SUPPLY)
11. REEL SENSOR (TAKE UP)
12. GND
13. +5V
14. SOL–
15. +B: 12V
16. CPM–
DC MOTOR REEL
REEL
180Ω
CPM
DC MOTOR CAPSTAN

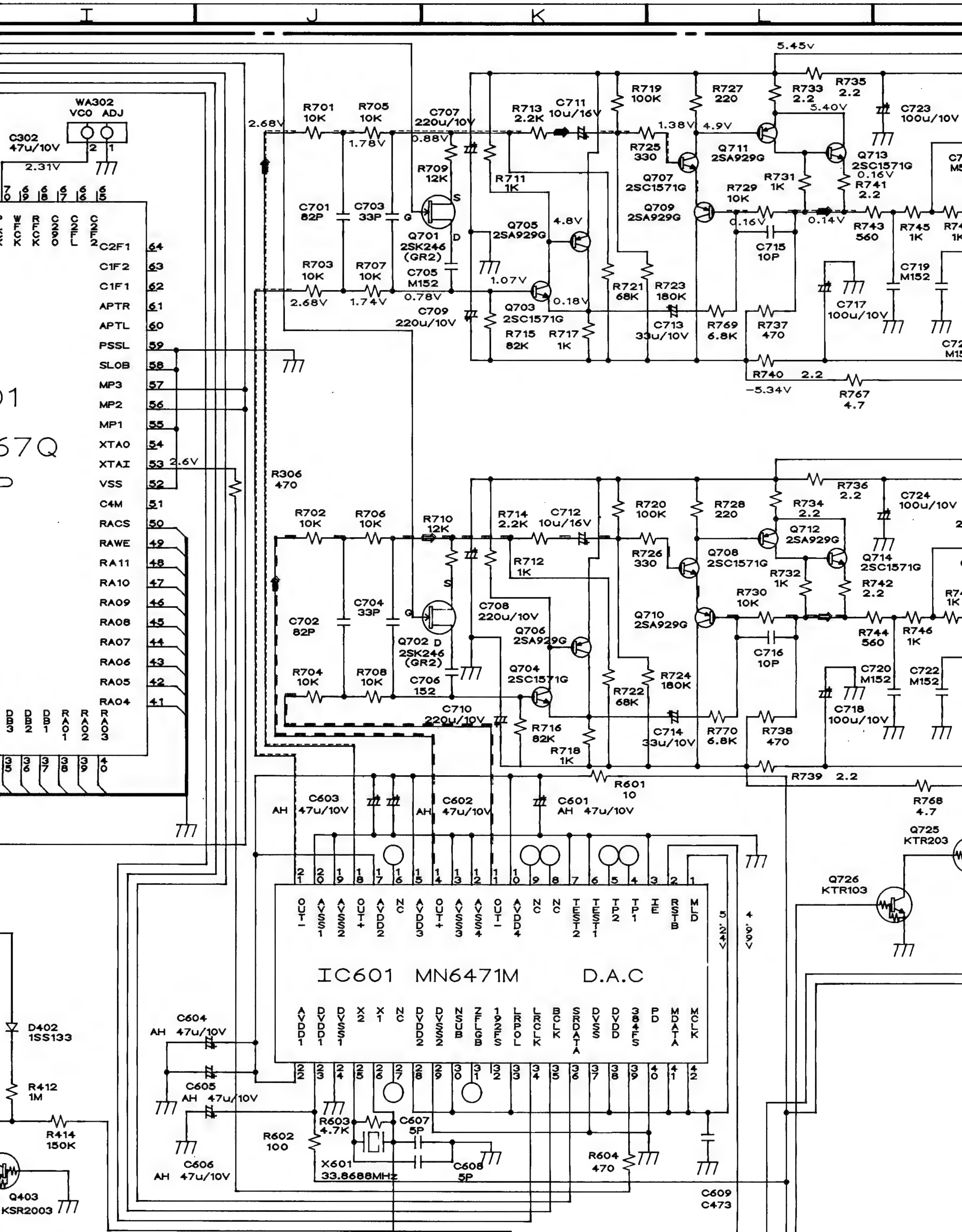

CN105
RED
REEL
LOADING
MOTOR
LOAD IN SWITCH
SPEED SWITCH
LOAD OUT SWITCH
LOADING PART
CN101
CN104
CN113
CN107
WA113
CN 108
DIP
IC201
ASS'Y
SW999
D999
R21
JP101
2-170-857-31
OPEN/CLOSE KEY P.C.B.
PCB-3
VR202 (R-CH)
VR201 (L-CH)
REC LEVEL ADJ
METAL
1
3
1
6
ERASE HD
1. YEL
2. WHT
3. SHIELD
R/P HD
1. ORG
2. BLU
3. SHIELD
4. SHIELD
5. BRN
6. RED
180Ω
180Ω
MOTOR
PSTAN

SCHEMATIC DIAGRAM (CD300/CD500)

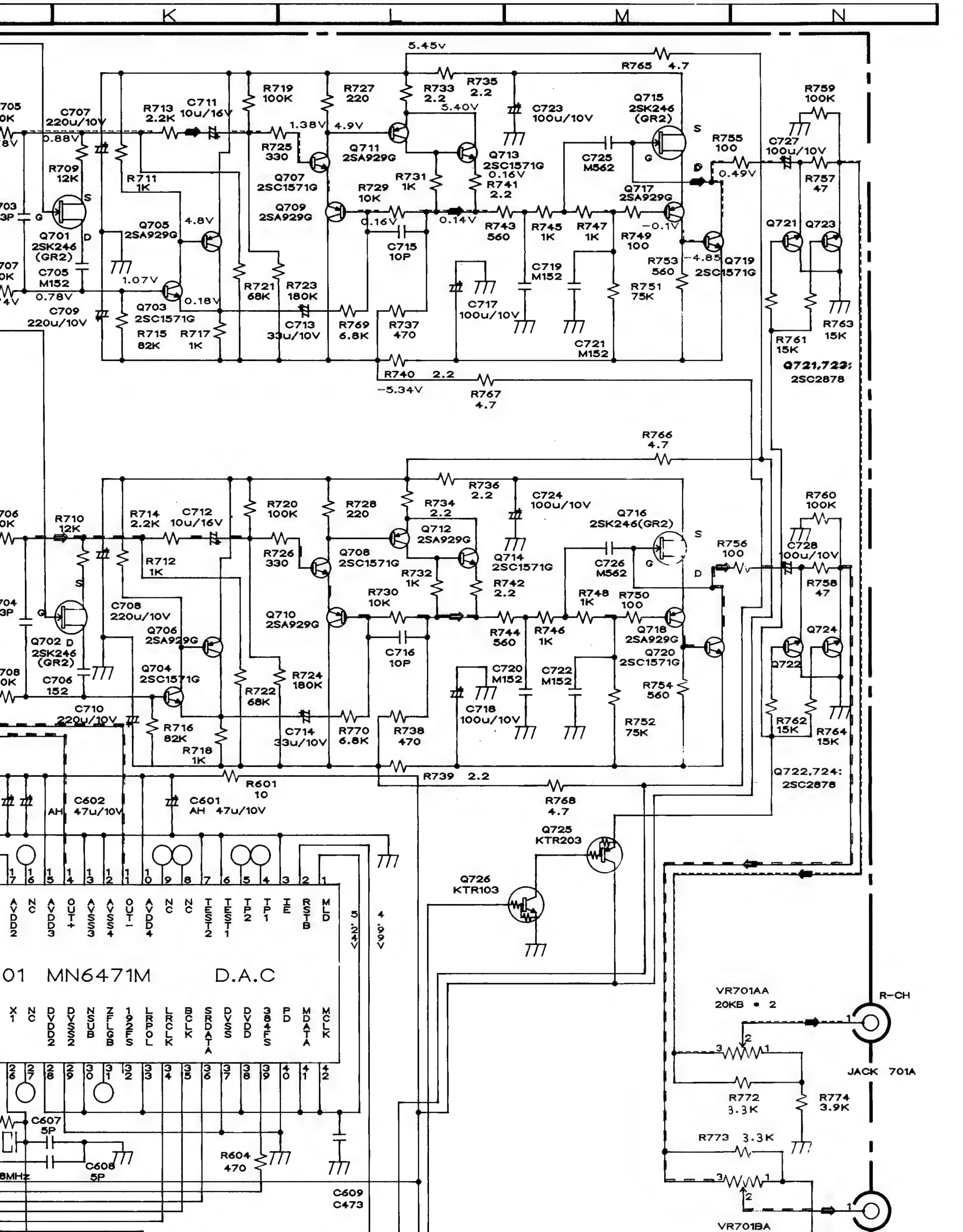




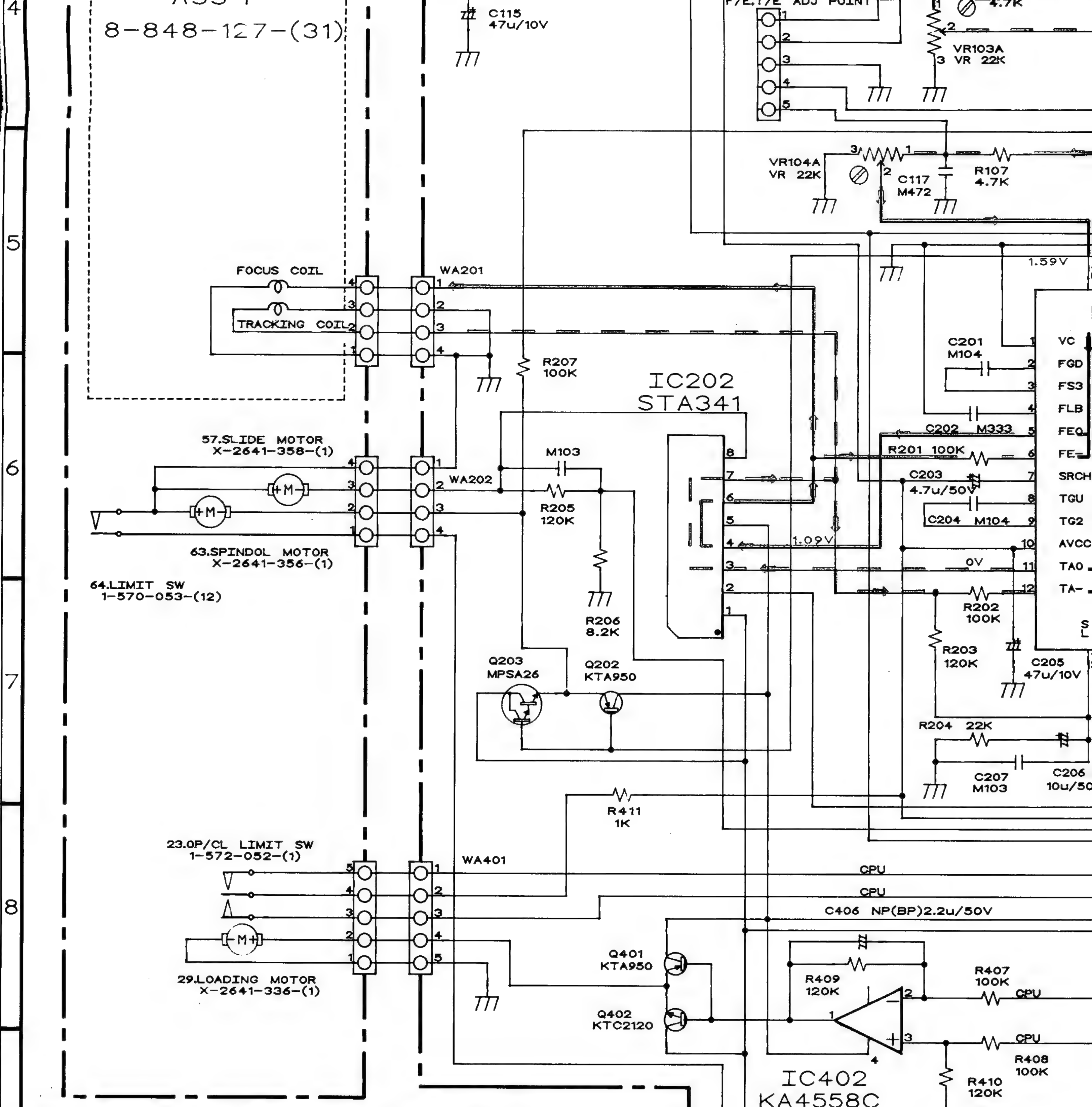
E
F
G
H
I
IC301
CXD-1167Q
D.S.P
IC201
CXA1082
S.S.P
LRCK
WDCK
DATA
BLCK
C210
C4LR
RAOV
VDD
GTOB
UGFS
PLCK
WFCK
RFCK
C290
C2FL
C2F2
FSW
MON
MDP
MDS
EFM
ASY
LOCK
VCOO
VCOI
TEST
PDO
VSS
CLK
XLT
DATA
RESET
CNIN
SENS
MUTG
CRCF
EXCK
SBSO
SUBQ
SCOR
C2F1
C1F2
C1F1
APTR
APTL
PSSL
SLOB
MP3
MP2
MP1
XTAO
XTAI
VSS
C4M
RACS
RAWE
RA11
RA10
RA09
RA08
RA07
RA06
RA05
RA04
SQCK
SQEX
DOTX
GFS
DB8
DB7
DB6
DB5
VDD
DB4
DB3
DB2
DB1
RAO1
RAO2
RAO3
R305 470
R304 470
R303 470
C301 C103
C302 47u/10V
WA302 VCO ADJ
2.31V
5.58V
2.85V
3.11V
2.7V
2.81V
5.6V
R301 100K
2.68V
R302 10K
-0.49V
0.33V
WA301
VCO CONTROL POINT
100K
R109 10K
C111 M103
C110 47u/10V
C116 M472
C219 47u/10V
CPU
C304 47u/10V
C303 C473
R216 22K
R215 1M
C216 M333
C217 0.47u/50V
2.89V
FSW
MON
MDS
LOCK
C864
3.5V
VCOF
ISET
PDI
BW
DGND
CLK
5.58V
2.85V
5.5V
2.46V
C215 M103
R214 2.2K
VR201A
VR 2.2K
R213 120K
C214 47u/10V
2.8V
C212 1u/50V
R209 100K
C211 M472
Q201 KTC1815
R211 10K
R212 10K
D403 1SS133
D402 1SS133
R413 1M
R412 1M
R414 150K
Q403 KSR2003
TE
DFCT
DVCC
MIRR
FOK
WDCK
SSDLO
SPLD
VCC
STOP
FSET
SENS
AVEE
C.OUT
DIRC
XRST
DATA
XLT



I
J
K
L
WA302
VCO ADJ
C302
47u/10V
2.31V
2.68V
R701
10K
R705
10K
1.78V
C707
220u/10V
0.88V
R713
2.2K
C711
10u/16V
R719
100K
R727
220
5.45V
R733
2.2
R735
2.2
5.40V
C723
100u/10V
1.38V
4.9V
R725
330
Q711
2SA929G
Q713
2SC1571G
0.16V
R741
2.2
R709
12K
R711
1K
Q707
2SC1571G
R731
1K
R729
10K
Q709
2SA929G
C701
82P
C703
33P
Q701
2SK246
(GR2)
Q705
2SA929G
4.8V
0.16V
0.14V
R743
560
R745
1K
C715
10P
R703
10K
R707
10K
C705
M152
1.07V
R721
68K
R723
180K
C719
M152
2.68V
1.74V
0.78V
C709
220u/10V
0.18V
Q703
2SC1571G
C713
33u/10V
R769
6.8K
R737
470
C717
100u/10V
R715
82K
R717
1K
R740 2.2
-5.34V
R767
4.7
C2F1 64
C1F2 63
C1F1 62
APTR 61
APTL 60
PSSL 59
SLOB 58
MP3 57
MP2 56
MP1 55
XTAO 54
XTAI 53
2.6V
VSS 52
C4M 51
RACS 50
RAWE 49
RA11 48
RA10 47
RA09 46
RA08 45
RA07 44
RA06 43
RA05 42
RA04 41
01
67Q
R306
470
R736
2.2
C724
100u/10V
R702
10K
R706
10K
R710
12K
R714
2.2K
C712
10u/16V
R720
100K
R728
220
R734
2.2
Q712
2SA929G
R726
330
Q708
2SC1571G
Q714
2SC1571G
R712
1K
R732
1K
R742
2.2
R730
10K
C704
33P
C702
82P
C708
220u/10V
Q710
2SA929G
Q706
2SA929G
R744
560
R746
1K
Q702
2SK246
(GR2)
C716
10P
Q704
2SC1571G
R704
10K
R708
10K
C706
152
R722
68K
R724
180K
C720
M152
C722
M152
C710
220u/10V
R716
82K
C714
33u/10V
R770
6.8K
R738
470
C718
100u/10V
R718
1K
R601
10
R739 2.2
R768
4.7
C603
AH 47u/10V
C602
AH 47u/10V
C601
AH 47u/10V
Q725
KTR203
Q726
KTR103
OUT- AVSS1 AVSS2 OUT+ AVDD2 NC AVDD3 OUT+ AVSS3 AVSS4 OUT- AVDD4 NC NC TEST2 TEST1 TP2 TP1 IE RSTB MLD
5.24V
4.99V
IC601 MN6471M D.A.C
AVDD1 DVDD1 DVSS1 X2 X1 NC DVDD2 DVSS2 NSUB ZFLGB 192FS LRPOL LRCLK BCLK SRDATA DVSS DVDD 384FS PD MDATA MCLK
D402
1SS133
C604
AH 47u/10V
R412
1M
C605
AH 47u/10V
R414
150K
R603
4.7K
C607
5P
R602
100
C606
AH 47u/10V
X601
33.8688MHz
C608
5P
R604
470
C609
C473
Q403
KSR2003

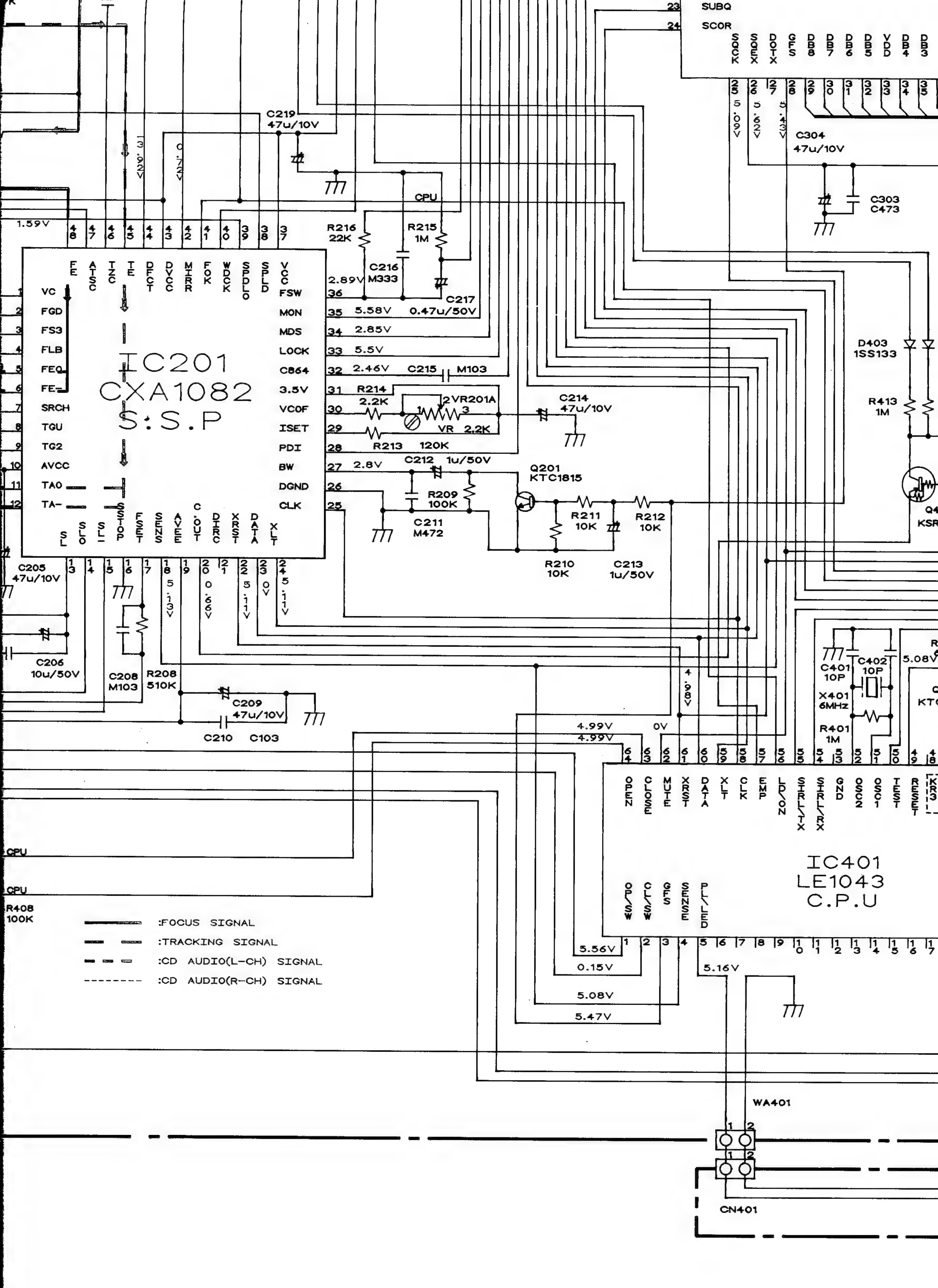


K
L
M
N
5.45V
R765 4.7
R719 100K
R727 220
R733 2.2
R735 2.2
5.40V
C723 100u/10V
Q715 2SK246 (GR2)
R759 100K
C705 0K
C707 220u/10V
R713 2.2K
C711 10u/16V
1.38V
4.9V
R725 330
Q711 2SA929G
Q713 2SC1571G
0.16V
R741 2.2
C725 M562
R755 100
C727 100u/10V
0.49V
R757 47
0.88V
R709 12K
R711 1K
Q707 2SC1571G
R731 1K
R729 10K
Q709 2SA929G
Q717 2SA929G
0.16V
0.14V
R743 560
R745 1K
R747 1K
R749 100
-0.1V
Q721
Q723
Q701 2SK246 (GR2)
C705 M152
Q705 2SA929G
4.8V
C715 10P
-4.85
Q719 2SC1571G
R753 560
C719 M152
R751 75K
1.07V
0.78V
Q703 2SC1571G
0.18V
R721 68K
R723 180K
C713 33u/10V
R769 6.8K
R737 470
C717 100u/10V
C709 220u/10V
R715 82K
R717 1K
C721 M152
R761 15K
R763 15K
R740 2.2
-5.34V
R767 4.7
Q721,723: 2SC2878
R766 4.7
R736 2.2
C724 100u/10V
R720 100K
R728 220
R734 2.2
Q716 2SK246(GR2)
R760 100K
R710 12K
R714 2.2K
C712 10u/16V
Q712 2SA929G
R726 330
Q708 2SC1571G
Q714 2SC1571G
C726 M562
R756 100
C728 100u/10V
R712 1K
R732 1K
R742 2.2
R758 47
R730 10K
R748 1K
R750 100
C708 220u/10V
Q710 2SA929G
Q706 2SA929G
R744 560
R746 1K
Q718 2SA929G
Q722
Q724
Q702 2SK246 (GR2)
C716 10P
Q720 2SC1571G
C706 152
Q704 2SC1571G
R724 180K
C720 M152
C722 M152
R754 560
R722 68K
C718 100u/10V
C710 220u/10V
R716 82K
C714 33u/10V
R770 6.8K
R738 470
R752 75K
R762 15K
R764 15K
R718 1K
R601 10
R739 2.2
Q722,724: 2SC2878
C602 47u/10V
C601 AH 47u/10V
R768 4.7
Q725 KTR203
Q726 KTR103
AVDD2
NC
AVDD3
OUT+
AVSS3
AVSS4
OUT-
AVDD4
NC
NC
TEST2
TEST1
TP2
TP1
IE
RSTB
MLD
5.24V
4.99V
MN6471M
D.A.C
X1
NC
DVDD2
DVSS2
NSUB
ZFLGB
192FS
LRPOL
LRCLK
BCLK
SRDATA
DVSS
DVDD
384FS
PD
MDATA
MCLK
VR701AA 20KB * 2
R-CH
JACK 701A
R772 3.3K
R774 3.9K
R773 3.3K
C607 5P
C608 5P
R604 470
C609 C473
VR701BA

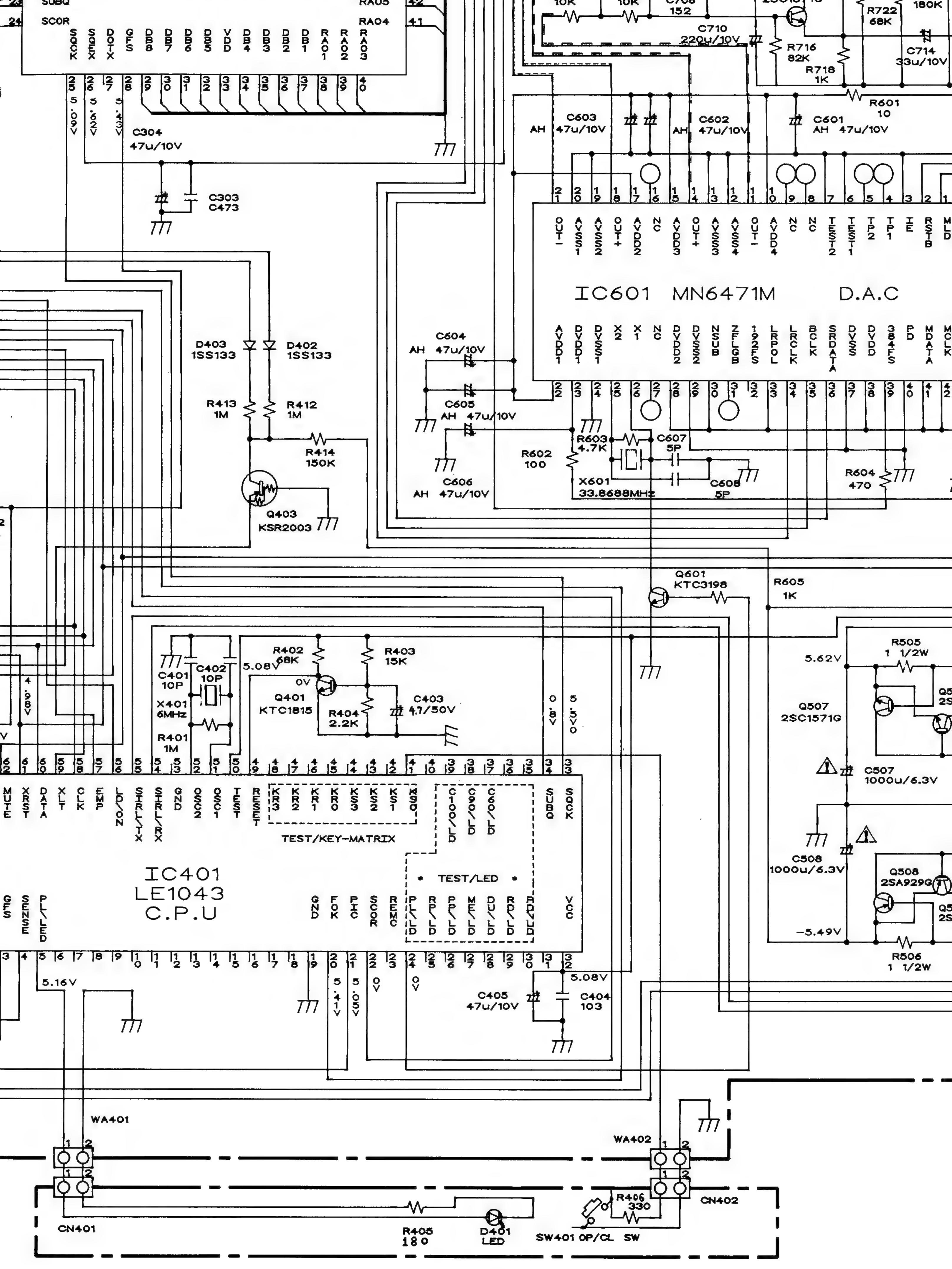


NOTE

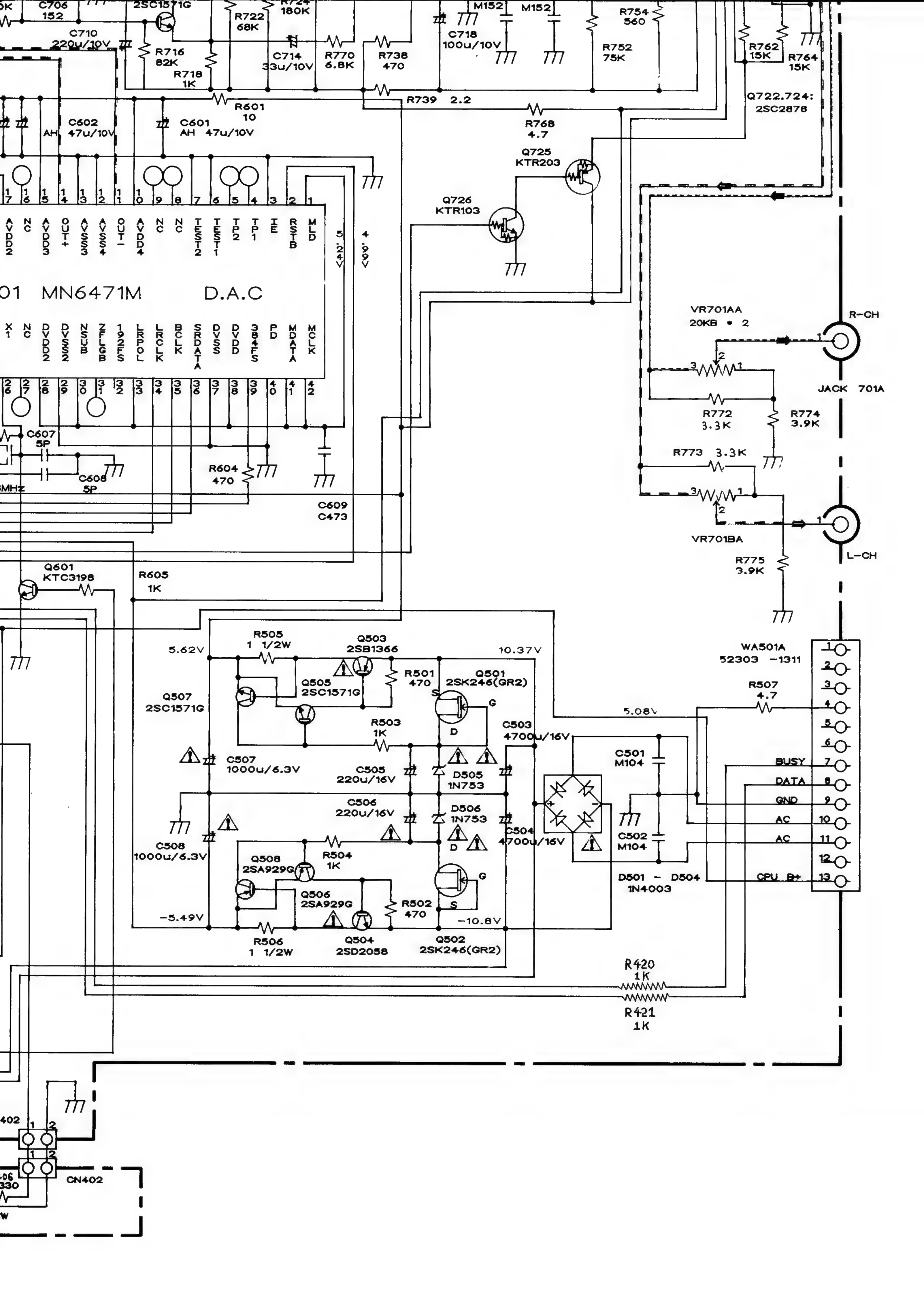
1. RESISTOR
   INDICATED IN OHM.1/2W.1/8W.+/-5%
   TOLERANCE UNLESS OTHERWISE NOTED
   K : K OHM, M : M OHM
2. CAPACITOR
   INDICATED IN CAPACITY (uF/VOLTAGE)
   UNLESS OTHERWISE NOTED P : pF
   EXCEP ELECTROLYTIC CAPACITOR
3. VOLTAGE
   DC VOLTAGE AT NO INPUT SIGNAL
4. OTHERS
   ➡ : SIGNAL ROUTE
   ⊘ : ADJUSTING POINT
5. THE ⚠ MARK FOUND ON SAME COMPONENT PARTS INDICATES THE IMPORTANCE OF THE SAFETY FACTOR OF THE RART. THE REFER.WHEN REPLACING.BE SURE TOUSE PARTS OF INDENTICAL DESIGNATION.



IC201
CXA1082
S.S.P
IC401
LE1043
C.P.U
SUBQ
SCOR
C219 47u/10V
C304 47u/10V
C303 C473
CPU
R216 22K
R215 1M
C216 M333
C217 0.47u/50V
FSW
MON
MDS
LOCK
C864
3.5V
VCOF
ISET
PDI
BW
DGND
CLK
VC
FGD
FS3
FLB
FEO
FE-
SRCH
TGU
TG2
AVCC
TAO
TA-
C215 M103
R214 2.2K
VR201A
VR 2.2K
R213 120K
C214 47u/10V
C212 1u/50V
Q201 KTC1815
R209 100K
C211 M472
R211 10K
R212 10K
R210 10K
C213 1u/50V
D403 1SS133
R413 1M
C205 47u/10V
C206 10u/50V
C208 M103
R208 510K
C209 47u/10V
C210 C103
C401 10P
C402 10P
X401 6MHz
R401 1M
OPEN
CLOSE
MUTE
XRST
DATA
XLT
EMP
LD/ON
SIRL/TX
SIRL/RX
GND
OSC2
OSC1
TEST
RESET
OP/SW
CL/SW
GFS
SENSE
PL/LED
R408 100K
WA401
CN401
:FOCUS SIGNAL
:TRACKING SIGNAL
:CD AUDIO(L-CH) SIGNAL
:CD AUDIO(R-CH) SIGNAL



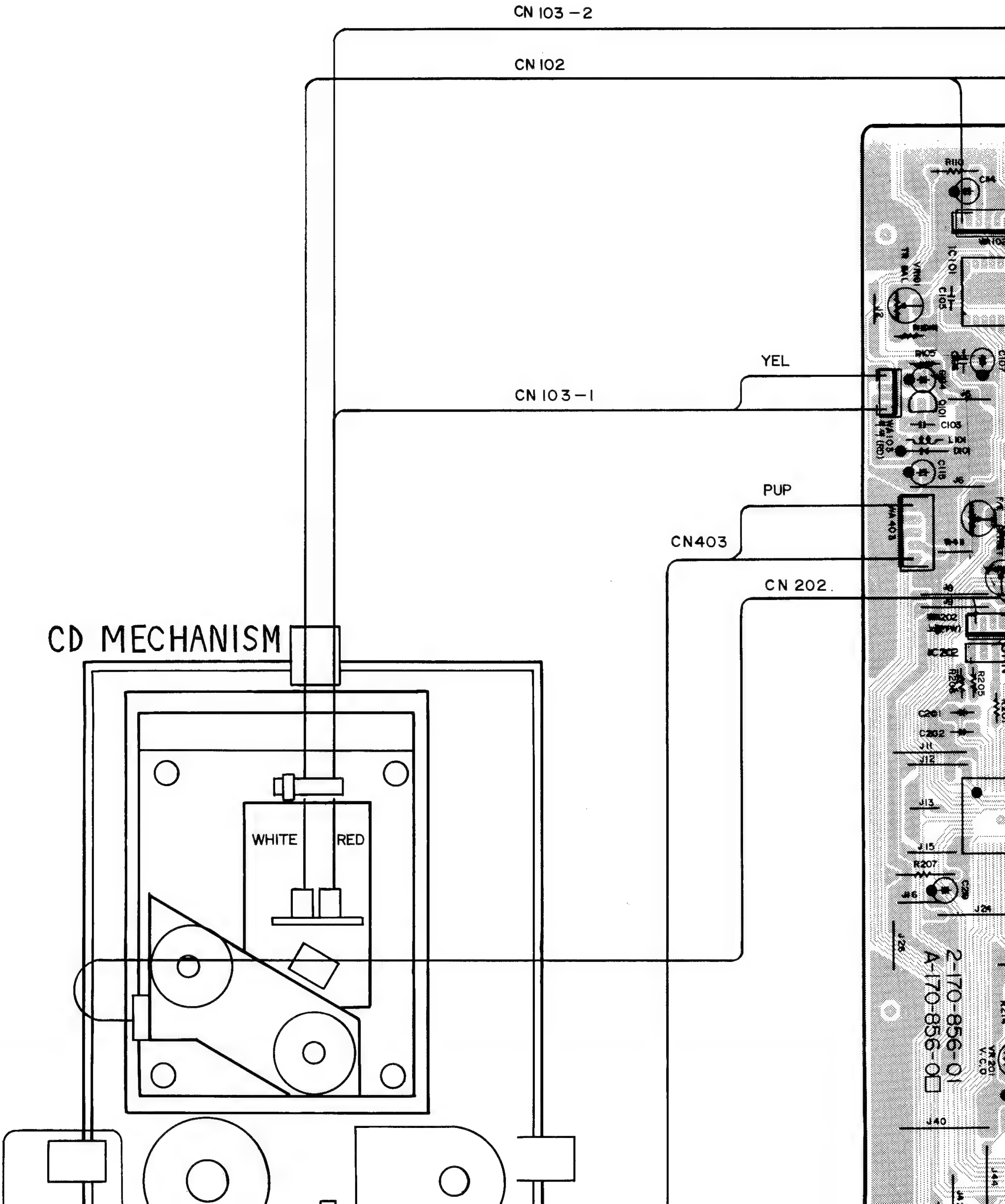
SUBQ
SCOR
RA05
RA04
C304
47u/10V
C303
C473
D403
1SS133
D402
1SS133
R413
1M
R412
1M
R414
150K
Q403
KSR2003
C603
47u/10V
C602
47u/10V
C601
47u/10V
R601
10
C710
220u/10V
R716
82K
R718
1K
R722
68K
180K
C714
33u/10V
C708
152
10K
IC601 MN6471M D.A.C
C604
47u/10V
C605
47u/10V
C606
47u/10V
R602
100
R603
4.7K
C607
5P
C608
5P
X601
33.8688MHz
R604
470
Q601
KTC3198
R605
1K
R505
1 1/2W
5.62V
Q507
2SC1571G
C507
1000u/6.3V
C508
1000u/6.3V
Q508
2SA929G
-5.49V
R506
1 1/2W
R402
68K
R403
15K
Q401
KTC1815
R404
2.2K
C403
4.7/50V
C401
10P
C402
10P
X401
6MHz
R401
1M
5.08V
TEST/KEY-MATRIX
TEST/LED
IC401
LE1043
C.P.U
C405
47u/10V
C404
103
5.16V
WA401
WA402
CN401
CN402
R405
180
D401
LED
R406
330
SW401 OP/CL SW

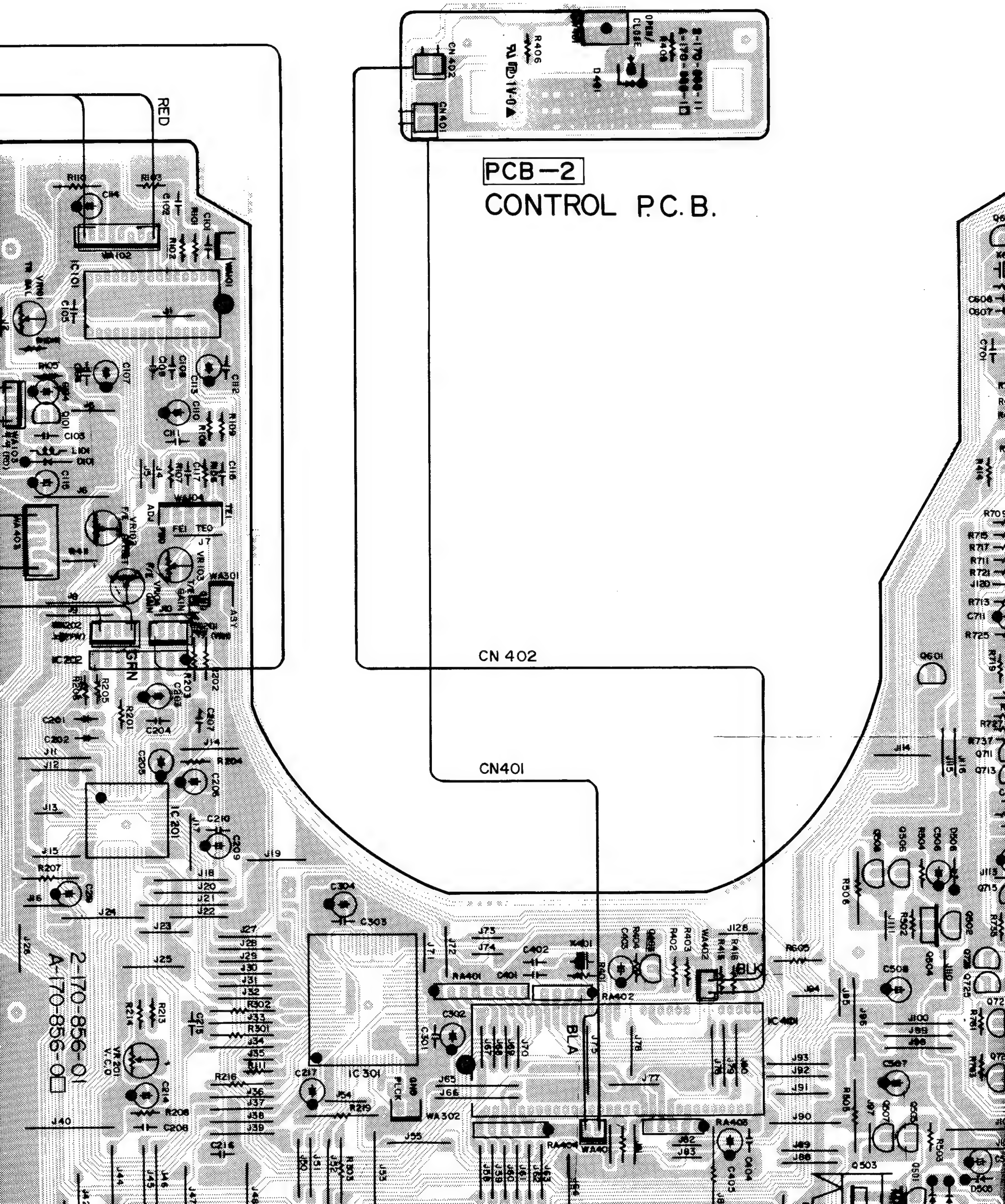


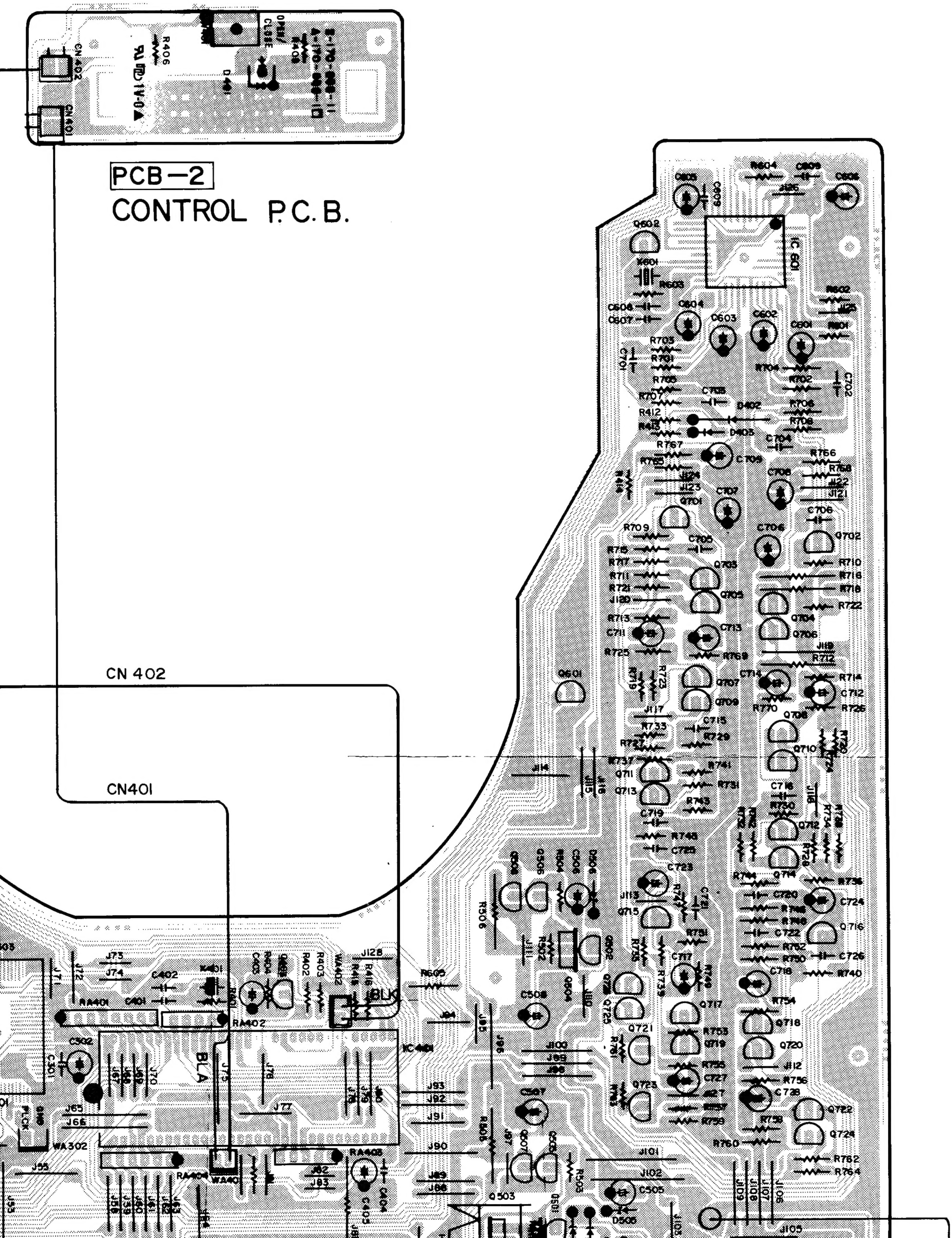
MN6471M
D.A.C
Q725 KTR203
Q726 KTR103
Q722.724: 2SC2878
VR701AA 20KB * 2
VR701BA
JACK 701A
R-CH
L-CH
WA501A 52303 -1311
BUSY
DATA
GND
AC
AC
CPU B+
Q601 KTC3198
Q503 2SB1366
Q505 2SC1571G
Q507 2SC1571G
Q501 2SK246(GR2)
Q502 2SK246(GR2)
Q504 2SD2058
Q506 2SA929G
Q508 2SA929G
D505 1N753
D506 1N753
D501 - D504 1N4003
C503 4700u/16V
C504 4700u/16V
C501 M104
C502 M104
C505 220u/16V
C506 220u/16V
C507 1000u/6.3V
C508 1000u/6.3V
R505 1 1/2W
R506 1 1/2W
R501 470
R502 470
R503 1K
R504 1K
R507 4.7
R420 1K
R421 1K
R605 1K
R604 470
C609 C473
C607 5P
C608 5P
C601 AH 47u/10V
C602 47u/10V
R601 10
R739 2.2
R768 4.7
R772 3.3K
R773 3.3K
R774 3.9K
R775 3.9K
R762 15K
R764 15K
R752 75K
R754 560
C718 100u/10V
C714 33u/10V
R770 6.8K
R738 470
R716 82K
R718 1K
R722 68K
R724 180K
C710 220u/10V
C706 152
CN402
5.62V
10.37V
5.08V
-5.49V
-10.8V

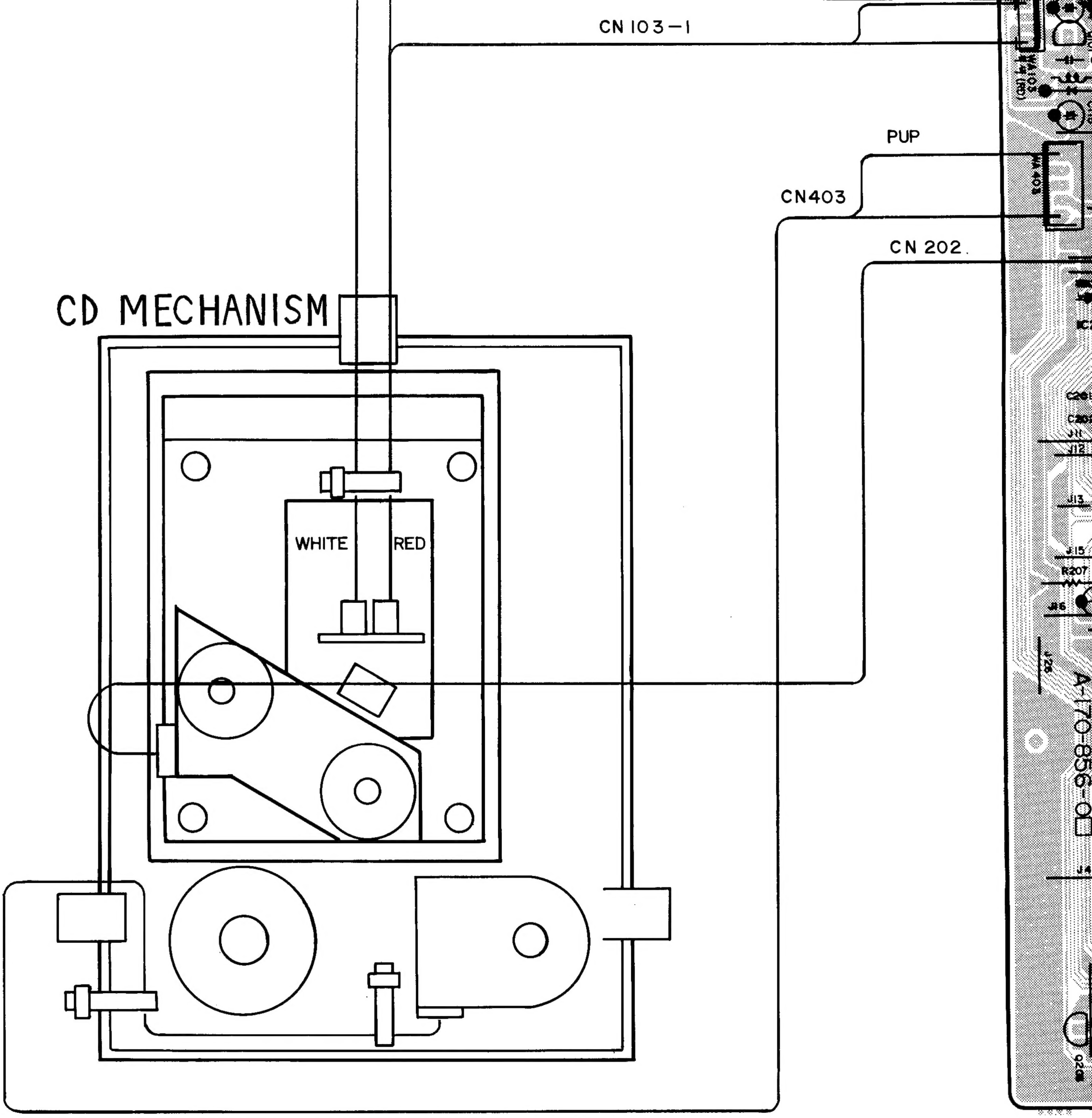
WIRING DIAGRAM

CD 300/500



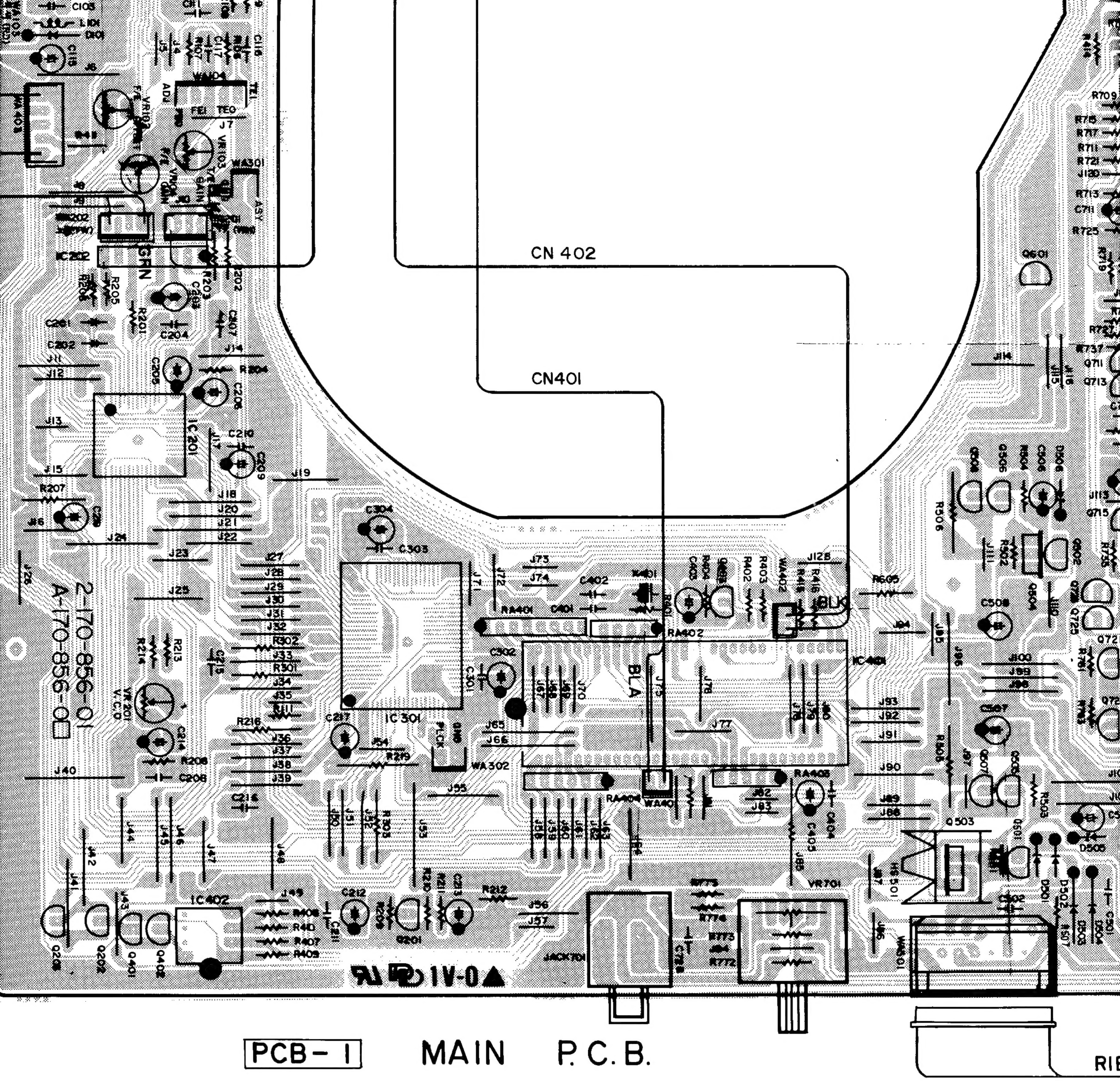

PCB—2
CONTROL P.C.B.
CN 402
CN401
2-170-856-01
A-170-856-0□


PCB—2
CONTROL P.C.B.
CN 402
CN401
IC 601
IC401

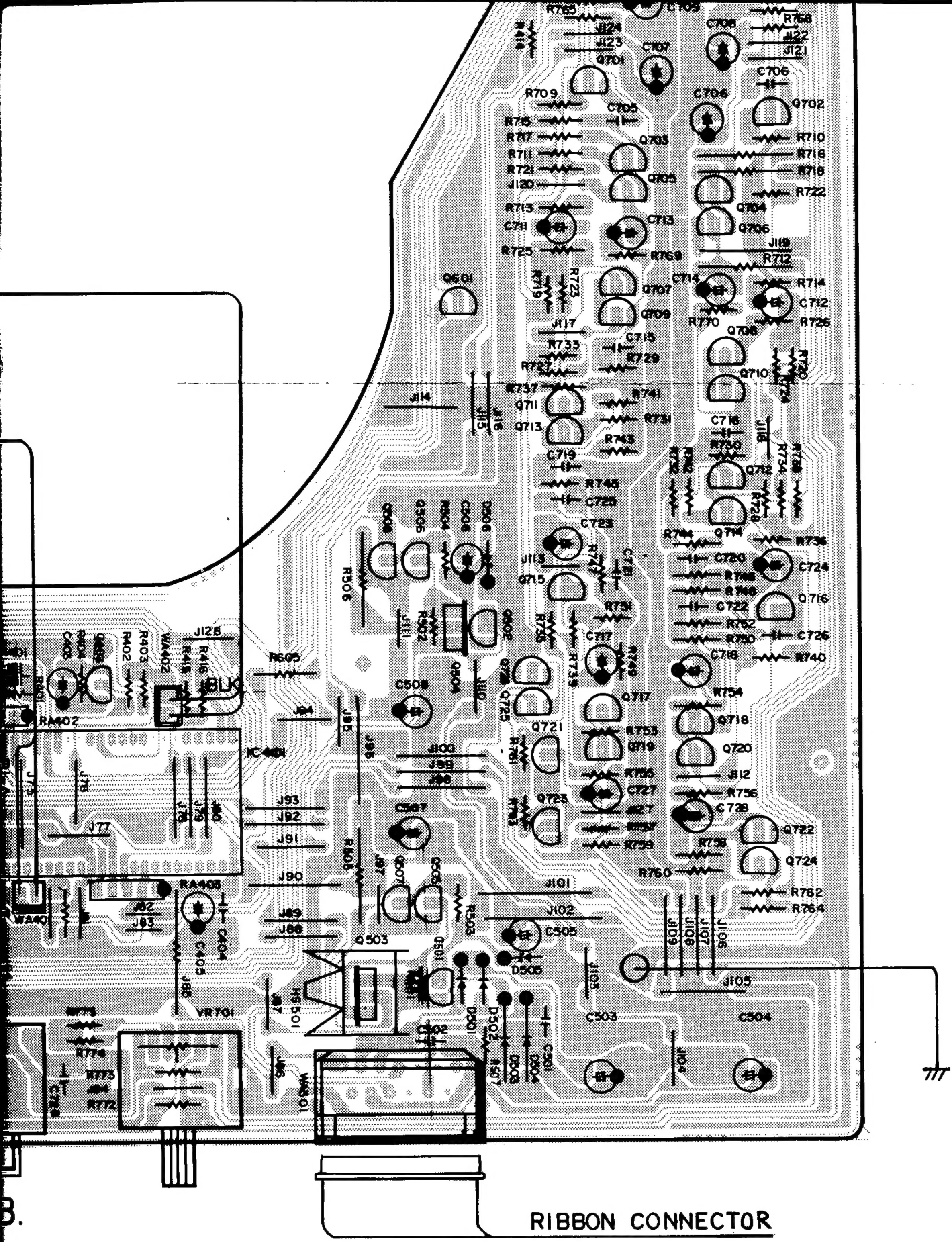


WIRE COLOR ABBREVIATIONS

YEL :	YELLOW	PUP :	PURPLE
BLK :	BLACK	RED :	RED
GRN :	GREEN		



PCB-1 MAIN P.C.B.


RIBBON CONNECTOR
IC401
RA402
RA403
WA402
VR701
HS501
Q501
Q503
Q504
Q505
Q506
Q507
Q508
Q601
Q701
Q702
Q703
Q704
Q705
Q706
Q707
Q708
Q709
Q710
Q711
Q712
Q713
Q714
Q715
Q716
Q717
Q718
Q719
Q720
Q721
Q722
Q723
Q724
C403
C404
C405
C501
C502
C503
C504
C505
C506
C507
C508
C705
C706
C707
C708
C711
C712
C713
C714
C715
C716
C717
C718
C719
C720
C722
C723
C724
C725
C726
C727
C728
D501
D502
D503
D504
D505
D506
R402
R403
R503
R504
R505
R506
R507
R605
R709
R710
R711
R712
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R718
R719
R721
R722
R723
R725
R726
R727
R729
R731
R733
R734
R735
R736
R737
R739
R740
R741
R743
R744
R745
R746
R747
R748
R750
R751
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R757
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R759
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R762
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J84
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J113
J114
J115
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J121
J122
J123
J124
J127
J128
BLK

B.